Anhang H

Listen der Kalibrationslinien

Für die lineare Kalibration wurden die folgenden Tabellen benutzt. In jeder Tabelle sind die im IR-Spektrum gemessenen Linienpositionen $\tilde{\nu}_{gem}$, die gemessenen Referenzwellenzahlen $\tilde{\nu}_{ref}$ und die mit dem Kalibrationsfaktor berechneten Wellenzahlen $\tilde{\nu}_{ber}$ angegeben. Die vorletzte Spalte gibt die Differenz $\tilde{\nu}_{ref} - \tilde{\nu}_{ber}$ in Einheiten von 10^{-5} cm^{-1} an. Die letzte Spalte gibt jeweils die Transmission der gemessenen Linienpositionen $\tilde{\nu}_{gem}$ an. Am Ende jeder Tabelle ist der berechnete Kalibrationsfaktor, der Fehler des Kalibrationsfaktors sowie der Standardmeßfehler angegeben. Die Quellen der Referenzwellenzahlen sind in den jeweiligen Kapiteln angegeben.

A Kalibrationslinien zu HCP

Tabelle A.1 CO_2 Kalibrationslinien zum Spektrum ZTGHCPCS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	642.837357	642.838135	642.838137	0.0174	0.15
2	651.933909	651.934706	651.934701	-0.0532	0.03
3	654.994927	654.995727	654.995722	-0.0521	0.03
4	658.070123	658.070920	658.070922	0.0173	0.03
5	661.159316	661.160121	661.160119	-0.0233	0.07
6	665.818992	665.819796	665.819800	0.0413	0.58
7	667.385232	667.386040	667.386042	0.0173	0.10
8	668.469707	668.470518	668.470518	0.0035	0.03
9	668.607681	668.608489	668.608493	0.0392	0.05
10	668.753780	668.754593	668.754591	-0.0161	0.07
11	668.908000	668.908809	668.908812	0.0268	0.11
12	671.293732	671.294548	671.294547	-0.0113	0.07
13	682.770986	682.771817	682.771815	-0.0230	0.76
14	691.971504	691.972342	691.972343	0.0147	0.07
Kalibrationsfaktor			1.000001214		
Fehler des Kalibrationsfaktors			0.000000001 cm^{-1}		
Standardmeßfehler			0.000003048 cm^{-1}		

Tabelle A.2 H_2O Kalibrationslinien zum Spektrum ZTGHCPGX.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	1387.521226	1387.523240	1387.523225	-0.1455	0.42
2	1397.731273	1397.733290	1397.733287	-0.0349	0.85
3	1399.202560	1399.204590	1399.204576	-0.1424	0.38
4	1417.496724	1417.498790	1417.498767	-0.2313	0.72
5	1419.506346	1419.508410	1419.508391	-0.1884	0.16
6	1423.702440	1423.704520	1423.704491	-0.2857	0.77
7	1429.943316	1429.945390	1429.945377	-0.1338	0.51
8	1436.478541	1436.480610	1436.480611	0.0079	0.51
9	1436.816545	1436.818590	1436.818616	0.2550	0.15
10	1452.064792	1452.066900	1452.066885	-0.1526	0.80
11	1455.299607	1455.301690	1455.301704	0.1407	0.65
12	1456.508075	1456.510160	1456.510174	0.1378	0.30
13	1459.259186	1459.261290	1459.261288	-0.0186	0.62
14	1464.903342	1464.905430	1464.905453	0.2320	0.21
15	1472.049453	1472.051550	1472.051574	0.2394	0.15
16	1476.130687	1476.132840	1476.132814	-0.2574	0.50
17	1476.427079	1476.429220	1476.429206	-0.1368	0.64
18	1507.482218	1507.484370	1507.484390	0.2036	0.88
19	1533.180430	1533.182630	1533.182640	0.0950	0.45
20	1542.157952	1542.160160	1542.160174	0.1363	0.15
21	1554.350509	1554.352730	1554.352748	0.1847	0.12
22	1559.688336	1559.690580	1559.690583	0.0312	0.30
Kalibrationsfaktor			1.000001441		
Fehler des Kalibrationsfaktors			0.000000003 cm^{-1}		
Standardmeßfehler			0.000017714 cm^{-1}		

Tabelle A.3 H_2O Kalibrationslinien zum Spektrum ZTGHCPFX.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	1363.061068	1363.063030	1363.063019	-0.1069	0.63
2	1387.521253	1387.523240	1387.523239	-0.0065	0.11
3	1399.202583	1399.204590	1399.204586	-0.0379	0.09
4	1409.966991	1409.969040	1409.969010	-0.3043	0.88
5	1418.931334	1418.933340	1418.933365	0.2500	0.34
6	1424.128278	1424.130320	1424.130317	-0.0299	0.48
7	1429.943335	1429.945390	1429.945382	-0.0842	0.18
8	1433.201569	1433.203620	1433.203620	0.0045	0.76
9	1436.478544	1436.480610	1436.480600	-0.0974	0.17
10	1437.024451	1437.026490	1437.026508	0.1764	0.53
11	1447.949880	1447.951950	1447.951953	0.0283	0.11
12	1455.299631	1455.301690	1455.301714	0.2441	0.31
13	1459.259222	1459.261290	1459.261311	0.2111	0.26
14	1471.479943	1471.482040	1471.482049	0.0910	0.65
15	1476.130729	1476.132840	1476.132842	0.0243	0.16
16	1476.427080	1476.429220	1476.429194	-0.2641	0.28
17	1501.843933	1501.846070	1501.846083	0.1255	0.67
18	1507.482225	1507.484370	1507.484382	0.1248	0.71
19	1509.782772	1509.784920	1509.784934	0.1367	0.45
20	1516.706142	1516.708330	1516.708313	-0.1709	0.20
21	1517.780981	1517.783180	1517.783154	-0.2608	0.57
22	1531.636377	1531.638590	1531.638569	-0.2090	0.46
23	1533.180450	1533.182630	1533.182645	0.1522	0.12
Kalibrationsfaktor			1.000001431		
Fehler des Kalibrationsfaktors			0.000000002 cm^{-1}		
Standardmeßfehler			0.000016708 cm^{-1}		

Tabelle A.4 OCS Kalibrationslinien zum Spektrum ZTHCPK.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	2029.117917	2029.120292	2029.120280	-0.1237	0.74
2	2029.684601	2029.686956	2029.686964	0.0829	0.71
3	2033.584700	2033.587067	2033.587068	0.0083	0.52
4	2034.747300	2034.749656	2034.749669	0.1319	0.78
5	2036.265478	2036.267843	2036.267849	0.0595	0.59
6	2036.277969	2036.280358	2036.280340	-0.1803	0.75
7	2036.766816	2036.769198	2036.769188	-0.1046	0.75
8	2036.834766	2036.837158	2036.837138	-0.2038	0.35
9	2037.265826	2037.268199	2037.268198	-0.0088	0.74
10	2038.748679	2038.751066	2038.751053	-0.1316	0.70
11	2038.760104	2038.762463	2038.762478	0.1486	0.71
12	2039.238274	2039.240642	2039.240648	0.0642	0.71
13	2039.249449	2039.251807	2039.251823	0.1643	0.70
14	2040.210332	2040.212719	2040.212708	-0.1145	0.68
15	2040.221022	2040.223412	2040.223398	-0.1444	0.68
16	2041.172973	2041.175361	2041.175350	-0.1133	0.67
17	2041.183207	2041.185568	2041.185584	0.1568	0.67
18	2042.599231	2042.601620	2042.601609	-0.1067	0.64
19	2043.538276	2043.540650	2043.540655	0.0542	0.64
20	2046.298595	2046.300995	2046.300978	-0.1736	0.62
21	2052.093581	2052.095960	2052.095970	0.1038	0.75
22	2061.384634	2061.387037	2061.387034	-0.0280	0.47
23	2062.145281	2062.147699	2062.147682	-0.1691	0.64
24	2062.513308	2062.515715	2062.515710	-0.0548	0.64
25	2063.212500	2063.214887	2063.214902	0.1533	0.63
26	2063.401034	2063.403446	2063.403437	-0.0945	0.35
27	2063.563383	2063.565782	2063.565786	0.0374	0.63
28	2063.574946	2063.577338	2063.577349	0.1075	0.63
29	2063.923974	2063.926385	2063.926377	-0.0784	0.63
30	2064.601563	2064.603945	2064.603967	0.2195	0.63
31	2064.956601	2064.959023	2064.959005	-0.1764	0.63
32	2065.951825	2065.954228	2065.954231	0.0252	0.65
33	2066.283322	2066.285731	2066.285728	-0.0309	0.64
34	2066.612396	2066.614804	2066.614802	-0.0171	0.66
35	2066.629262	2066.631658	2066.631668	0.1031	0.66
36	2066.956522	2066.958907	2066.958929	0.2169	0.67
37	2067.904374	2067.906772	2067.906782	0.0979	0.70
38	2067.923678	2067.926072	2067.926086	0.1382	0.70
39	2068.221276	2068.223676	2068.223684	0.0816	0.71
40	2068.535712	2068.538142	2068.538121	-0.2147	0.72
41	2068.556290	2068.558681	2068.558699	0.1755	0.72
42	2069.157330	2069.159757	2069.159739	-0.1775	0.72
43	2069.769198	2069.771605	2069.771608	0.0297	0.75
44	2070.071449	2070.073863	2070.073859	-0.0368	0.77
45	2081.268524	2081.270959	2081.270947	-0.1165	0.40
46	2082.304128	2082.306573	2082.306553	-0.2044	0.52
47	2082.556791	2082.559210	2082.559216	0.0585	0.55
48	2083.299657	2083.302063	2083.302083	0.1972	0.64
49	2083.542239	2083.544658	2083.544665	0.0700	0.66
50	2083.782314	2083.784740	2083.784740	0.0028	0.69
51	2084.254946	2084.257362	2084.257373	0.1083	0.74
Kalibrationsfaktor			1.000001164		
Fehler des Kalibrationsfaktors			0.000000001 cm^{-1}		
Standardmeßfehler			0.000012716 cm^{-1}		

Tabelle A.5 OCS Kalibrationslinien zum Spektrum ZTGHCPHX.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	2897.483006	2897.484749	2897.484836	0.8673	0.99
2	2899.676950	2899.678834	2899.678781	-0.5270	0.99
3	2901.285094	2901.286976	2901.286926	-0.5017	0.99
4	2902.339502	2902.341285	2902.341334	0.4935	0.99
5	2902.861312	2902.863111	2902.863145	0.3415	0.99
6	2903.379418	2903.381387	2903.381251	-1.3584	0.99
7	2904.405386	2904.407303	2904.407220	-0.8290	0.99
8	2904.913204	2904.914946	2904.915039	0.9274	0.99
9	2905.417392	2905.419051	2905.419227	1.7609	0.99
10	2905.917603	2905.919618	2905.919438	-1.8027	0.99
11	2906.414972	2906.416650	2906.416807	1.5741	0.99
12	2907.884614	2907.886565	2907.886450	-1.1496	0.99
13	2909.795265	2909.797105	2909.797102	-0.0305	0.99
14	2912.104317	2912.106158	2912.106156	-0.0202	0.99
15	2913.888626	2913.890226	2913.890466	2.3965	0.99
16	2914.325552	2914.327479	2914.327393	-0.8638	0.99
17	2916.039664	2916.041448	2916.041505	0.5712	0.99
18	2920.463953	2920.465649	2920.465797	1.4778	0.99
19	2921.222421	2921.224392	2921.224265	-1.2681	0.99
20	2922.334208	2922.336085	2922.336054	-0.3123	0.99
21	2923.057728	2923.059564	2923.059573	0.0930	0.99
22	2924.804513	2924.806301	2924.806360	0.5881	0.99
23	2925.809659	2925.811705	2925.811507	-1.9800	0.99
24	2926.138077	2926.139710	2926.139924	2.1443	0.99
25	2926.462320	2926.464142	2926.464168	0.2634	0.99
26	2927.414090	2927.415963	2927.415938	-0.2457	0.99
27	2928.633012	2928.634778	2928.634861	0.8347	0.99
28	2928.928675	2928.930474	2928.930525	0.5056	0.99
29	2929.220758	2929.222557	2929.222608	0.5072	0.99
30	2930.352880	2930.354674	2930.354730	0.5619	0.99
31	2930.626988	2930.628628	2930.628838	2.1008	0.99
32	2930.896854	2930.898942	2930.898704	-2.3776	0.99
33	2931.163691	2931.165613	2931.165542	-0.7124	0.99
34	2931.686226	2931.688007	2931.688078	0.7051	0.99
35	2932.686782	2932.688887	2932.688633	-2.5361	0.99
36	2933.165238	2933.167308	2933.167090	-2.1817	0.99
Kalibrationsfaktor			1.000000631		
Fehler des Kalibrationsfaktors			0.000000007 cm^{-1}		
Standardmeßfehler			0.000129483 cm^{-1}		

Tabelle A.6 OCS Kalibrationslinien zum Spektrum ZTGHCPIX.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	2904.405519	2904.407303	2904.407296	-0.0737	0.94
2	2904.913156	2904.914946	2904.914933	-0.1260	0.94
3	2905.417282	2905.419051	2905.419059	0.0839	0.94
4	2905.917864	2905.919618	2905.919641	0.2344	0.94
5	2906.414859	2906.416650	2906.416637	-0.1336	0.94
6	2906.908363	2906.910151	2906.910142	-0.0950	0.93
7	2907.398348	2907.400122	2907.400126	0.0441	0.93
8	2907.884801	2907.886565	2907.886580	0.1499	0.93
9	2908.367718	2908.369482	2908.369497	0.1478	0.93
10	2908.847104	2908.848877	2908.848883	0.0646	0.93
11	2909.795328	2909.797105	2909.797108	0.0275	0.93
12	2910.264139	2910.265943	2910.265919	-0.2403	0.94
13	2911.191302	2911.193074	2911.193083	0.0891	0.94
14	2911.649601	2911.651371	2911.651382	0.1138	0.94
15	2912.104357	2912.106158	2912.106139	-0.1933	0.94
16	2922.697778	2922.699591	2922.699566	-0.2454	0.94
17	2923.414233	2923.416000	2923.416021	0.2148	0.94
18	2924.804500	2924.806301	2924.806290	-0.1145	0.93
19	2926.462362	2926.464142	2926.464153	0.1056	0.93
20	2927.414166	2927.415963	2927.415957	-0.0616	0.93
21	2928.030781	2928.032568	2928.032572	0.0440	0.93
22	2928.333681	2928.335475	2928.335472	-0.0291	0.93
23	2928.632964	2928.634778	2928.634756	-0.2238	0.93
24	2929.794097	2929.795867	2929.795889	0.2226	0.94
25	2930.352881	2930.354674	2930.354673	-0.0054	0.94
Kalibrationsfaktor			1.000000612		
Fehler des Kalibrationsfaktors			0.000000001 cm^{-1}		
Standardmeßfehler			0.000014637 cm^{-1}		

B Kalibrationslinien zu DCP

Tabelle B.7 CO_2 Kalibrationslinien zum Spektrum ZTDCPM.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	647.369214	647.370075	647.370072	-0.0306	0.29
2	650.408703	650.409558	650.409565	0.0697	0.27
3	654.994861	654.995727	654.995729	0.0204	0.22
4	658.070040	658.070920	658.070912	-0.0788	0.23
5	664.262266	664.263152	664.263146	-0.0567	0.62
6	667.385158	667.386040	667.386042	0.0246	0.39
7	668.218154	668.219037	668.219040	0.0257	0.12
8	668.469626	668.470518	668.470512	-0.0610	0.21
9	668.607605	668.608489	668.608491	0.0208	0.27
10	669.070236	669.071119	669.071123	0.0370	0.49
11	669.240609	669.241503	669.241496	-0.0708	0.54
12	669.725283	669.726165	669.726171	0.0557	0.45
13	671.293664	671.294548	671.294554	0.0564	0.33
14	676.018453	676.019349	676.019349	-0.0009	0.16
15	680.772106	680.773015	680.773008	-0.0680	0.14
16	682.362939	682.363841	682.363843	0.0231	0.14
17	685.553805	685.554709	685.554714	0.0454	0.17
18	700.057757	700.058686	700.058685	-0.0124	0.63
Kalibrationsfaktor			1.000001325		
Fehler des Kalibrationsfaktors			0.000000002 cm^{-1}		
Standardmeßfehler			0.000004916 cm^{-1}		

Tabelle B.8 CO Kalibrationslinien zum Spektrum TDCPAS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	2094.860106	2094.862332	2094.862271	-0.6064	0.80
2	2099.080637	2099.082735	2099.082807	0.7182	0.78
3	2103.267560	2103.269747	2103.269734	-0.1285	0.77
4	2115.626819	2115.628975	2115.629006	0.3113	0.75
5	2119.678770	2119.680959	2119.680961	0.0201	0.76
6	2123.696614	2123.698818	2123.698809	-0.0863	0.77
7	2127.680213	2127.682406	2127.682413	0.0669	0.79
8	2135.543984	2135.546180	2135.546192	0.1162	0.86
9	2154.593419	2154.595583	2154.595646	0.6311	0.78
10	2158.297505	2158.299712	2158.299736	0.2394	0.74
11	2161.966002	2161.968247	2161.968237	-0.0957	0.71
12	2165.598773	2165.601042	2165.601012	-0.2971	0.69
13	2169.195624	2169.197950	2169.197866	-0.8359	0.68
14	2176.281231	2176.283519	2176.283480	-0.3857	0.68
15	2183.221549	2183.223781	2183.223806	0.2471	0.71
16	2186.636747	2186.639055	2186.639007	-0.4776	0.73
17	2190.015276	2190.017562	2190.017540	-0.2157	0.74
18	2196.661500	2196.663692	2196.663771	0.7870	0.79
Kalibrationsfaktor			1.000001034		
Fehler des Kalibrationsfaktors			0.000000005 cm^{-1}		
Standardmeßfehler			0.000044579 cm^{-1}		

Tabelle B.9 CO Kalibrationslinien zum Spektrum TDCPBS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	2094.860120	2094.862332	2094.862288	-0.4417	0.76
2	2099.080498	2099.082735	2099.082671	-0.6410	0.73
3	2103.267532	2103.269747	2103.269709	-0.3796	0.71
4	2111.540803	2111.543014	2111.542989	-0.2530	0.68
5	2115.626819	2115.628975	2115.629009	0.3373	0.68
6	2119.678770	2119.680959	2119.680964	0.0462	0.69
7	2123.696572	2123.698818	2123.698770	-0.4752	0.70
8	2127.680241	2127.682406	2127.682443	0.3701	0.73
9	2131.629429	2131.631575	2131.631635	0.5999	0.77
10	2135.543956	2135.546180	2135.546167	-0.1346	0.83
11	2150.853827	2150.856008	2150.856054	0.4569	0.82
12	2154.593363	2154.595583	2154.595593	0.1036	0.75
13	2158.297477	2158.299712	2158.299711	-0.0110	0.70
14	2161.965975	2161.968247	2161.968212	-0.3461	0.67
15	2165.598773	2165.601042	2165.601015	-0.2705	0.64
16	2176.281258	2176.283519	2176.283511	-0.0819	0.64
17	2183.221521	2183.223781	2183.223781	-0.0031	0.68
18	2186.636857	2186.639055	2186.639121	0.6573	0.70
19	2190.015276	2190.017562	2190.017543	-0.1887	0.72
20	2193.356888	2193.359157	2193.359159	0.0159	0.77
21	2196.661417	2196.663692	2196.663690	-0.0169	0.79
22	2199.928806	2199.931022	2199.931083	0.6079	0.83
Kalibrationsfaktor			1.000001035		
Fehler des Kalibrationsfaktors			0.000000004 cm^{-1}		
Standardmeßfehler			0.000037338 cm^{-1}		

Tabelle B.10 H_2O Kalibrationslinien zum Spektrum ZTDCPGS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	3718.958373	3718.963130	3718.963103	-0.2687	0.50
2	3724.969683	3724.974440	3724.974421	-0.1922	0.67
3	3752.495889	3752.500690	3752.500662	-0.2821	0.49
4	3840.121198	3840.126110	3840.126082	-0.2776	0.78
5	3857.159264	3857.164190	3857.164170	-0.2009	0.55
6	3873.719492	3873.724400	3873.724419	0.1898	0.74
7	3886.072155	3886.077110	3886.077098	-0.1231	0.39
8	3899.211725	3899.216710	3899.216684	-0.2560	0.41
9	3902.244987	3902.249930	3902.249950	0.2026	0.69
10	3925.129405	3925.134350	3925.134397	0.4736	0.79
11	3942.647404	3942.652350	3942.652419	0.6865	0.59
Kalibrationsfaktor			1.000001272		
Fehler des Kalibrationsfaktors			0.000000003 cm^{-1}		
Standardmeßfehler			0.000034049 cm^{-1}		

Tabelle B.11 H_2O Kalibrationslinien zum Spektrum ZTDCPFS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	3724.969726	3724.974440	3724.974477	0.3657	0.61
2	3734.267855	3734.272650	3734.272617	-0.3257	0.53
3	3735.439976	3735.444710	3735.444740	0.2993	0.61
4	3735.487828	3735.492640	3735.492592	-0.4801	0.41
5	3738.395852	3738.400660	3738.400620	-0.4031	0.38
6	3741.301352	3741.306120	3741.306123	0.0340	0.44
7	3752.495847	3752.500690	3752.500633	-0.5732	0.43
8	3753.813835	3753.818620	3753.818622	0.0236	0.76
9	3779.757368	3779.762180	3779.762188	0.0845	0.77
10	3784.578965	3784.583700	3784.583792	0.9159	0.60
11	3797.783165	3797.787930	3797.788008	0.7843	0.72
12	3800.438275	3800.443030	3800.443122	0.9182	0.78
13	3802.960786	3802.965640	3802.965636	-0.0396	0.45
14	3839.924439	3839.929330	3839.929336	0.0618	0.55
15	3853.570822	3853.575720	3853.575737	0.1658	0.48
16	3857.159264	3857.164190	3857.164183	-0.0684	0.51
17	3864.305072	3864.309960	3864.310000	0.4027	0.66
18	3883.261590	3883.266590	3883.266542	-0.4755	0.66
19	3916.323751	3916.328730	3916.328746	0.1561	0.73
20	3917.280794	3917.285870	3917.285790	-0.8017	0.39
21	3917.357580	3917.362630	3917.362576	-0.5407	0.73
22	3942.647276	3942.652350	3942.652304	-0.4582	0.54
Kalibrationsfaktor			1.000001275		
Fehler des Kalibrationsfaktors			0.000000003 cm^{-1}		
Standardmeßfehler			0.000048561 cm^{-1}		

Tabelle B.12 H_2O Kalibrationslinien zum Spektrum ZTDCPDS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	5225.316480	5225.323900	5225.323953	0.5347	0.65
2	5263.968090	5263.975630	5263.975619	-0.1125	0.54
3	5338.747400	5338.755080	5338.755036	-0.4430	0.52
4	5344.517470	5344.525160	5344.525114	-0.4605	0.61
5	5428.718170	5428.726000	5428.725934	-0.6562	0.55
6	5434.912650	5434.920390	5434.920423	0.3324	0.55
7	5440.862570	5440.870340	5440.870352	0.1175	0.67
8	5445.719320	5445.727040	5445.727109	0.6870	0.63
Kalibrationsfaktor			1.000001430		
Fehler des Kalibrationsfaktors			0.000000003 cm^{-1}		
Standardmeßfehler			0.000049765 cm^{-1}		

Tabelle B.13 H_2O Kalibrationslinien zum Spektrum ZTDCPIS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	5230.807631	5230.814590	5230.814430	-1.6045	0.36
2	5441.028563	5441.035730	5441.035635	-0.9523	0.38
3	5445.719846	5445.727040	5445.726924	-1.1613	0.70
4	5469.520485	5469.527230	5469.527594	3.6381	0.65
Kalibrationsfaktor			1.000001300		
Fehler des Kalibrationsfaktors			0.000000023 cm^{-1}		
Standardmeßfehler			0.000245393 cm^{-1}		

C Kalibrationslinien zu HBS

Tabelle C.14 H_2O Kalibrationslinien zum Spektrum ZTGHBSCS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	1244.136979	1244.138470	1244.138717	2.4685	0.88
2	1260.341979	1260.343840	1260.343740	-1.0031	0.84
3	1287.398443	1287.400390	1287.400241	-1.4852	0.79
4	1288.248459	1288.250250	1288.250258	0.0817	0.80
Kalibrationsfaktor			1.000001397		
Fehler des Kalibrationsfaktors			0.000000069 cm^{-1}		
Standardmeßfehler			0.000176184 cm^{-1}		

Tabelle C.15 H_2O Kalibrationslinien zum Spektrum ZTGHBSFS.1.

#	$\tilde{\nu}_{gem}$	$\tilde{\nu}_{ref}$	$\tilde{\nu}_{ber}$	$\tilde{\nu}_{ber} - \tilde{\nu}_{ref}$	Transmission
1	2317.188373	2317.195190	2317.195413	2.2287	1.01
2	2330.550574	2330.557540	2330.557654	1.1427	0.93
3	2334.149370	2334.156780	2334.156462	-3.1800	0.91
4	2337.651663	2337.658490	2337.658765	2.7494	0.89
5	2339.365791	2339.372690	2339.372898	2.0835	0.92
6	2344.360875	2344.368420	2344.367998	-4.2247	0.98
7	2345.977093	2345.984610	2345.984220	-3.8986	0.99
8	2354.426923	2354.433800	2354.434076	2.7611	0.95
9	2355.882389	2355.889830	2355.889547	-2.8307	0.93
10	2357.314086	2357.321130	2357.321248	1.1788	0.92
11	2358.720260	2358.727680	2358.727427	-2.5345	0.89
12	2360.102299	2360.109430	2360.109469	0.3915	0.90
13	2362.791326	2362.798500	2362.798505	0.0472	0.89
14	2370.261320	2370.268350	2370.268521	1.7142	0.96
15	2372.551578	2372.558550	2372.558787	2.3658	0.99
Kalibrationsfaktor			1.000003038		
Fehler des Kalibrationsfaktors			0.000000028 cm^{-1}		
Standardmeßfehler			0.000258392 cm^{-1}		

Anhang I

Linienlisten von $H^{12}CP$, $H^{13}CP$

Wie die Tabellen zu lesen sind: Die Linien (FT-IR-Übergänge) sind nach Subbanden geordnet. Jeder Eintrag in diesen Tabellen führt die Quantenzahl J'' des unteren Rotationsvibrationsniveaus, die beobachtete Wellenzahl $\tilde{\nu}$ in cm^{-1} des Übergangs, die experimentelle Unsicherheit in 10^{-6} cm^{-1}und zwei verschiedenen Spalten mit den Abweichungen der gemessenen gegenüber der berechneten Linienpositionen auf. Die Spalte Δ_{eff} enthält die Abweichungen, die aus den Fits des effektiven Hamiltionians nach YAMADA *et al.*, entstanden. Die Spalte Δ_{ps} zeigt die Abweichungen aus den Fits der Reihenentwicklung in $J(J+1)$. Die Abweichung werden in Einheiten von 10^{-6} cm^{-1} mitgeteilt. Wellenzahlen die mit einem * markiert sind wurden nicht im Fit benutzt. Alle Linien sind mit $1/(\delta\tilde{\nu})^2$ in allen Fits gewichtet.

A Tabellen zu HCP

Tabelle A.1 $H^{12}CP$ $(010)^{1e,f} \leftarrow (000)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				–				675.364062*		−675	−665
1	–				674.035298	47	−47	−48	676.695962	49	21	31
2	–				674.040441	31	6	5	678.026424	33	28	38
3	670.032738	69	−27	−19	674.048072	25	2	1	679.356064	33	−20	−11
4	668.698029	45	−38	−31	674.058257	22	9	8	680.684979	25	−9	0
5	667.362720	38	−2	5	674.070964	20	−4	−5	682.013078	25	−12	−4
6	666.026741	28	−3	4	674.086229	18	−1	−1	683.340376	22	2	10
7	664.690144	28	−6	0	674.104023	18	−7	−7	684.666805	21	−16	−9
8	663.352940	23	−17	−12	674.124370	17	2	2	685.992409	20	−4	2
9	662.015167	23	−14	−10	674.147239	17	−2	−1	687.317120	19	−13	−8
10	660.676822	21	−16	−12	674.172648	17	2	3	688.640953	19	−10	−7
11	659.337944	20	1	4	674.200581	17	0	1	689.963898	18	13	15
12	657.998512	20	−1	1	674.231044	17	2	3	691.285872	19	−9	−8
13	656.658572	19	8	11	674.264020	17	−7	−5	692.606932	19	0	0
14	655.318098	20	−12	−10	674.299533	17	2	4	693.927022	19	3	0
15	653.977153	20	−14	−13	674.337544	18	−6	−4	695.246112	20	−14	−18
16	652.635771	20	20	20	674.378084	18	3	6	696.564240	20	8	2
17	651.293882	22	5	5	674.421120	18	2	5	697.881335	22	15	8
18	649.951565	22	4	4	674.466646	19	−11	−8	699.197385	23	14	6
19	648.608833	24	16	16	674.514700	19	7	10	700.512376	25	11	2
20	647.265654	25	−5	−6	674.565222	20	1	5	701.826309	27	25	15
21	645.922111	28	7	5	674.618220	21	−14	−10	703.139118	29	9	−1
22	644.578173	30	7	6	674.673734	22	7	11	704.450834	33	14	4
23	643.233876	32	17	15	674.731688	23	−6	−2	705.761404	34	5	−5
24	641.889184	38	−15	−16	674.792112	25	−16	−11	707.070846	40	20	12
25	640.544201	38	3	1	674.855007	27	−15	−11	708.379083	42	1	−4
26	639.198897	47	25	23	674.920383	28	13	18	709.686153	51	6	4
27	637.853215	48	−20	−22	674.988164	32	1	5	710.992010	55	9	11
28	636.507302	61	1	−1	675.058381	34	−15	−11	–			
29	635.161050	65	−34	−36	675.131051	39	−7	−4	–			
30	633.814589	74	−9	−11	675.206131	43	−12	−9	–			
31	632.467882	90	25	23	675.283630	50	−13	−10	–			
32	631.120865	40	−8	−11	675.364062*		515	517	–			
33	629.773641	30	−21	−23	675.445853	67	5	7	–			

... *Fortsetzung auf der nächsten Seite*

Tabelle A.1 Fortsetzung von $H^{12}CP$ $(010)^{1e,f} \leftarrow (000)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
34	628.426 234	21	−2	−4	675.530 559	82	23	25	–			
35	627.078 606	18	−2	−5	675.617 602	104	1	2	–			
36	625.730 788	15	−5	−8	(675.707 034)				–			
37	624.382 810	13	8	5	675.798 809	29	−16	−16	–			
38	623.034 656	13	6	3	675.892 947	22	−17	−17	–			
39	621.686 363	12	15	11	675.989 437	19	−2	−3	–			
40	620.337 918	13	7	4	676.088 251	16	11	10	–			
41	618.989 339	14	−10	−14	676.189 359	15	4	1	–			
42	617.640 690	16	12	9	676.292 782	15	7	5	–			
43	616.291 901	20	−6	−10	676.398 488	16	3	0	–			
44	614.943 054	23	3	−1	676.506 473	17	−3	−5	–			
45	613.594 118	30	−4	−7	676.616 742	20	8	6	–			
46	612.245 138	33	7	5	676.729 263	23	16	14	–			
47	610.896 055	50	−36	−37	676.844 008	28	6	4	–			
48	609.547 061	52	48	48	676.960 959	35	−28	−28	–			
49	–				677.080 142	46	−45	−45	–			
50	–				677.201 542	53	−49	−46	–			
51	–				677.325 271*		89	93	–			
52	–				677.450 915	103	−34	−27	–			
53	–				677.578 797	136	−79	−68	–			
54	–				677.709 056	106	107	122	–			
55	–				677.841 127	106	−25	−6	–			

Tabelle A.2 $H^{12}CP$ $(020)^{0e} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				660.945 845	15	−45	−42	663.617 598	37	0	16
2	658.285 307	16	12	28	660.943 981	13	21	24	664.956 356	23	−5	8
3	656.958 013	14	13	27	660.941 076	12	20	23	666.297 365	17	15	26
4	655.633 047	13	5	15	660.937 158	12	−12	−8	(667.640 534)			
5	654.310 429	12	−1	6	660.932 290	13	2	6	668.985 894	16	15	19
6	652.990 175	12	10	13	660.926 385	13	−8	−4	670.333 341	14	−6	−7
7	651.672 249	12	0	−1	660.919 455	14	−13	−8	671.682 914	16	15	12
8	650.356 686	12	9	4	660.911 476	15	−12	−7	673.034 480	14	−8	−15
9	649.043 440	13	−3	−12	660.902 418	15	−11	−5	674.388 053	16	−16	−25
10	647.732 546	12	10	−2	660.892 255	16	−5	0	675.743 592	14	3	−8
11	646.423 942	13	−1	−16	660.880 939	16	−12	−6	677.100 976	16	−18	−31
12	645.117 648	12	1	−15	660.868 457	16	−8	−1	678.460 376*		149	137
13	643.813 629	13	2	−14	660.854 764	16	1	8	679.821 214	15	−11	−23
14	642.511 850	12	−8	−24	660.839 798	15	−6	2	681.183 927	15	2	−7
15	641.212 324	13	9	−5	660.823 523	16	−19	−11	682.548 245	14	−13	−19
16	639.914 959	12	−7	−17	660.805 922	15	−6	1	683.914 157	15	5	2
17	638.619 780	13	4	−3	660.786 908	14	−3	4	685.281 537	13	3	5
18	637.326 694	13	−15	−17	660.766 432	14	−5	2	686.650 313	14	−11	−5
19	636.035 731	13	7	11	660.744 444	13	−3	3	688.020 439	13	−2	7
20	634.746 762	13	−13	−4	660.720 877	13	−3	3	689.391 800	13	−2	11
21	633.459 819	13	2	16	660.695 670	13	−2	3	690.764 315	14	−2	13
22	632.174 793	14	−4	14	660.668 750	12	−6	−3	692.137 900	14	4	19
23	630.891 675	14	12	32	660.640 058	12	−4	−2	693.512 443	15	−3	10
24	629.610 351	15	−6	15	660.609 516	12	−1	−1	694.887 877	15	8	17
25	628.330 817	15	−1	16	660.577 045	13	0	−2	696.264 095	16	29	32
26	627.052 986	16	0	13	660.542 568	13	−1	−4	697.640 930	18	−5	−10
27	625.776 794	16	2	6	660.506 016	14	10	6	699.018 375	18	6	−9
28	624.502 170	18	1	−7	660.467 288	15	13	8	700.396 256	21	−6	−32
29	623.229 058	20	12	−10	660.426 295	16	7	1	701.774 512	23	8	−27
30	621.957 371	23	23	−16	660.382 967	18	8	3	703.152 976	25	−7	−49
31	620.687 017	26	17	−39	660.337 187	21	−10	−15	704.531 586	32	1	−41
32	619.417 949	29	26	−46	660.288 864	22	−47	−50	705.910 173	34	−21	−53
33	618.150 071	37	34	−50	660.238 050	27	42	42	707.288 694	43	2	−6
34	616.883 330	40	70	−19	660.184 402	32	10	13	708.666 932	48	−29	9
35	615.617 548	47	40	−41	660.128 001	39	33	39	710.044 883	57	2	115
36	614.352 812	58	116	61	660.068 631	47	−8	2	711.422 325	70	−6	220
37	613.088 876	79	138	135	660.006 296	59	−12	1	–			
38	611.825 629	93	82	167	659.940 851	77	−24	−10	–			
39	–				659.872 198	89	−45	−35	–			
40	–				659.800 241	129	−72	−72	–			
41	–				659.725 057	191	69	49	–			
42	–				659.646 245	225	76	22	–			

Tabelle A.3 $H^{12}CP$ $(020)^{2e,f} \leftarrow (010)^{1e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				681.125 485	15	−9	−4
2	–				–				682.464 476	14	−17	−11
3	–				678.468 749	14	16	8	683.805 836	15	8	14
4	673.141 159	28	−15	−14	678.478 200	14	3	−5	685.149 486	14	−9	−2
5	671.818 907	24	−1	0	678.490 036	15	11	3	686.495 481	15	−14	−7
6	670.499 114	17	−13	−13	678.504 224	16	9	0	687.843 832	14	1	9
7	669.181 877	17	12	11	678.520 772	18	5	−4	689.194 497	14	−11	−3
8	667.867 152	15	−8	−9	678.539 682	18	4	−5	690.547 540	15	2	10
9	666.555 060	15	7	7	678.560 952	19	5	−3	691.902 923	14	−11	−3
10	665.245 576	14	−10	−11	678.584 570	20	−1	−8	693.260 711	15	−1	7
11	663.938 830	13	21	20	678.610 550	20	3	−4	694.620 884	14	−8	−1
12	662.634 777	13	7	5	678.638 878	20	6	−1	695.983 487	14	−12	−5
13	661.333 532	13	7	5	678.669 551	21	6	1	697.348 554	15	−3	2
14	660.035 120	13	−10	−12	678.702 557	20	−3	−8	698.716 101	14	4	7
15	658.739 650	12	3	1	678.737 915	20	1	−3	700.086 147	15	−6	−4
16	657.447 147	13	8	6	678.775 612	20	7	5	701.458 760	15	−1	0
17	656.157 667	12	−5	−8	678.815 627	19	1	−1	702.833 950	15	−9	−10
18	654.871 321	13	3	0	678.857 977	18	2	2	704.211 798	15	7	5
19	653.588 148	13	−1	−4	678.902 662	18	16	18	705.592 307	15	5	2
20	652.308 238	13	−4	−7	678.949 636	17	2	6	706.975 535	16	−5	−10
21	651.031 684	14	7	4	678.998 928	17	−6	−1	708.361 563	16	6	1
22	649.758 535	14	−1	−3	679.050 534	16	−7	0	709.750 407	17	−1	−6
23	648.488 907	16	4	2	679.104 440	16	−8	0	711.142 172	17	24	20
24	647.222 867	16	−1	−2	679.160 643	16	−8	3	712.536 828	18	−10	−13
25	645.960 536	18	15	16	679.219 128	16	−13	−1	–			
26	644.701 955	19	0	2	679.279 901	16	−12	0	–			
27	643.447 276	22	10	13	679.342 960	17	0	13	–			
28	642.196 543	25	−9	−5	679.408 261	17	−14	−1	–			
29	640.949 948	28	34	38	679.475 829	18	−20	−9	–			
30	639.707 472	32	19	23	679.545 652	19	−24	−16	–			
31	638.469 162	29	−113	−110	679.617 737	21	−11	−6	–			
32	637.235 519	43	34	34	679.692 051	23	−4	−4	–			
33	636.006 228	52	39	33	679.768 599	25	9	2	–			
34	634.781 512	67	14	1	679.847 362	30	19	2	–			
35	633.561 620	81	100	76	679.928 340	33	35	5	–			
36	632.346 429	93	62	24	680.011 510	41	43	−2	–			
37	631.136 150*		2	−56	680.096 892	96	73	9	–			
38	629.931 053	152	78	−6	680.184 431	106	80	−6	–			
39	628.731 063	160	104	−12	680.274 109	223	57	−56	–			

Tabelle A.4 $H^{12}CP$ $(020)^{2e,f} \leftarrow (010)^{1f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				681.122242	15	12	21
2	–				678.451871	17	15	0	682.454674	14	−19	−10
3	674.446276	64	−53	−46	678.449209	14	21	7	683.786211	15	0	9
4	673.108536	28	−16	−11	678.445653	14	5	−7	685.116753	14	−11	−3
5	671.769951	24	1	6	678.441258	15	9	−1	686.446331	15	−6	1
6	670.430537	17	−2	2	678.436026	16	16	8	687.774906	14	−5	2
7	669.090347	17	12	15	678.429943	17	−8	−14	689.102459	14	−10	−4
8	667.749346	15	−11	−8	678.423107	18	9	5	690.428997	14	5	10
9	666.407623	14	4	5	678.415475	19	−4	−6	691.754457	14	−6	−2
10	665.065122	14	−17	−17	678.407122	20	−4	−4	693.078853	15	−11	−7
11	663.721937	13	4	4	678.398082	20	8	8	694.402178	14	1	4
12	662.378021	14	3	2	678.388357	20	−6	−5	695.724371	15	−12	−10
13	661.033414	12	5	4	678.378034	20	−1	1	697.045460	15	−4	−3
14	659.688119	13	−4	−6	678.367129	20	−7	−5	698.365388	15	−15	−15
15	658.342174	12	−3	−4	678.355713	19	−1	0	699.684186	15	6	5
16	656.995573	12	−12	−13	678.343831	18	7	8	701.001789	14	11	10
17	655.648368	13	4	3	678.331521	18	1	0	702.318173	16	−4	−5
18	654.300528	12	−2	−3	678.318875	17	12	10	703.633363	15	4	3
19	652.952105	13	7	7	678.305913	17	−1	−6	704.947300	16	−6	−6
20	651.603089	13	5	5	678.292747	16	7	0	706.260001	15	4	4
21	650.253505	13	1	2	678.279421	15	11	2	707.571406	16	−10	−8
22	648.903368	14	−5	−3	678.266007	15	11	1	708.881557	16	15	19
23	647.552713	14	7	10	678.252580	14	7	−4	710.190355	16	−1	5
24	646.201524	16	5	9	678.239228	14	9	−2	711.497819	18	−20	−13
25	644.849813	16	−14	−8	678.226025	14	11	1	712.803961	18	−12	−1
26	643.497647	19	3	9	678.213041	14	−1	−9	–			
27	642.144968	20	−17	−12	678.200397	14	8	3	–			
28	640.791868	22	2	6	678.188137	15	−6	−8	–			
29	639.438267	26	−34	−32	678.176400	15	6	9	–			
30	638.084305	27	1	0	678.165243	16	9	16	–			
31	636.729889	34	−2	−7	678.154746	17	−13	−2	–			
32	635.375101	36	27	15	678.145066	19	2	17	–			
33	634.019927	46	58	37	678.136185	21	−61	−45	–			
34	632.664273	48	−17	−49	678.128397	24	−8	7	–			
35	631.308445	63	95	49	678.121646	28	7	16	–			
36	629.952145	62	81	18	678.116043	32	−6	−10	–			
37	628.595566	87	122	37	678.111834	106	98	72	–			
38	627.238573	543	68	−44	–				–			
39	625.881373	743	113	−30	–				–			
40	624.523828*		105	−75	–				–			
41	623.165894	247	−11	−235	–				–			

Tabelle A.5 $H^{12}CP\ (030)^{1e,f} \leftarrow (020)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				–				666.973442	350	17	24
1	–				665.645705	155	40	21	668.302075	173	23	31
2	662.970430*		−314	−308	665.653038	96	12	−6	669.627661	134	−190	−181
3	661.630853	250	−132	−125	665.664097	67	23	5	670.950821	93	12	21
4	(660.288500)				665.678836	55	18	2	672.270853	100	−63	−54
5	658.943221	108	−96	−89	665.697285	47	16	1	673.588280	64	115	125
6	657.595442	100	−25	−17	665.719463	40	22	9	674.902554	72	4	13
7	656.244925	84	−58	−50	665.745372	36	22	11	676.214284*		215	224
8	654.891878	73	−23	−14	665.775021	35	5	−4	677.522708	62	−14	−5
9	653.536233	69	−25	−16	665.808459	32	−1	−9	678.828520	65	9	16
10	652.178089	56	−7	2	665.845693	32	−14	−22	680.131415	61	−26	−21
11	650.817423	62	−35	−27	665.886798	32	13	7	681.431546	56	25	28
12	649.454416	62	26	33	665.931716	32	−6	−12	682.728767	56	7	7
13	648.088910	64	−31	−24	665.980567	32	16	10	684.023178	59	6	2
14	646.721181	43	19	25	666.033326	31	20	14	685.314774	56	2	−6
15	645.351086	63	−20	−16	666.090045	34	21	16	686.603596	60	17	6
16	643.978824	73	−6	−3	666.150715	32	−27	−33	687.889589	61	−24	−38
17	642.604418	68	25	27	666.215550	36	47	40	689.172870	66	−28	−45
18	641.227838	78	−18	−17	666.284340	41	−9	−16	690.453474	67	14	−4
19	639.849318	80	34	35	666.357327	43	3	−4	691.731366	66	39	21
20	(638.468742)				666.434473	48	−2	−8	693.006515	79	−17	−33
21	637.086322	93	21	23	666.515838	54	−11	−17	694.279114	91	7	−4
22	635.701949	90	−82	−79	666.601526	58	30	25	695.549064	100	−25	−29
23	634.316080	112	73	78	666.691469	60	2	−1	(696.816517)			
24	632.928288	125	−17	−10	666.785819	77	7	6	698.081502	123	71	91
25	631.539018	171	14	23	666.884574	87	−11	−10	699.343847	156	−29	7
26	630.148304	159	121	129	666.987818	102	−20	−18	700.603824	178	−74	−17
27	628.755898	210	−29	−25	667.095629	114	4	6	701.861585	224	42	120
28	627.362219	201	−102	−106	667.208029	156	29	28	–			
29	625.967378	150	−72	−93	667.325016	187	0	−8	–			
30	624.571486	244	82	34	667.446878*		150	130	–			
31	623.174394	379	120	30	667.573331*		144	103	–			
32	621.776017*		−133	−287	–				–			

Tabelle A.6 $H^{12}CP\ (030)^{1e,f} \leftarrow (020)^{2f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	645.469238	375	−88	−1	–				–			
3	644.142337	383	44	126	648.116988	520	−130	−160	–			
4	642.818750	244	−170	−98	648.105695	310	40	13	–			
5	641.499290	262	66	124	648.091346	190	24	0	–			
6	640.183142	299	−77	−36	648.074145	167	30	10	–			
7	638.871126	262	203	225	648.054083	194	51	35	658.936973	390	−174	−292
8	637.562320	184	−29	−28	648.031162	150	94	83	660.303288	560	18	−131
9	636.257661	329	150	130	648.005115	165	−103	−110	661.672956	502	127	−50
10	634.956432	198	7	−32	647.976513	141	37	33	663.045953	410	150	−51
11	633.659206	286	102	47	647.944787	132	−50	−51	664.422460*		291	71
12	632.365500	225	−59	−127	647.910293	120	−2	0	665.802228*		323	90
13	631.075942	193	138	63	647.872832	136	−10	−6	667.185134	506	147	−91
14	629.789799	237	−51	−127	647.832440	139	−31	−26	668.571235	555	−154	−390
15	628.507777	197	70	0	647.789221	146	48	52	669.961998*		912	686
16	627.229496	231	111	54	647.742923	142	−17	−14	671.354324*		273	63
17	625.954774	238	−118	−155	647.693778	168	15	16	672.750408	645	152	−35
18	624.684337	245	99	90	647.641597	173	−35	−37	(674.149673)			
19	623.417387	289	−40	−16	647.586620	197	82	77	675.551967*		−303	−432
20	622.154420	402	−45	17	647.528457	194	−12	−20	676.958444*		427	329
21	620.895327	313	−30	72	647.467572	249	158	147	(678.366879)			
22	–				647.403182	250	−181	−194	679.778663	800	−159	−216
23	–				647.336340	255	37	24	681.193695	898	−115	−171
24	–				(647.266223)				(682.611804)			
25	–				647.193215	414	106	105	684.032793	428	30	−103
26	–				647.116933	106	−16	−4	–			

Tabelle A.7 $H^{12}CP$ $(030)^{1e,f} \leftarrow (020)^{2e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	645.462747	273	−102	−269	–							
3	644.122979	368	125	3	648.156013	447	70	168				
4	642.779851	287	−171	−245	648.170323	280	−17	66				
5	641.434510	326	154	129	648.188322	219	14	82				
6	640.085941	334	90	111	648.209854	149	29	80				
7	638.734424	321	−76	−15	648.234972	166	105	138				
8	637.380315	261	24	118	648.263371	156	−35	−20				
9	636.023307	278	99	216	648.295430	137	20	19				
10	634.663066	232	−165	−36	648.330786	136	−56	−73				
11	633.300215	294	−120	12	648.369621	131	−41	−69				
12	631.934378	274	−114	10	648.411882	137	58	21				
13	630.565622	243	−47	60	648.457214	124	−65	−108				
14	629.193703	283	−127	−42	648.505896	123	−78	−121				
15	627.818936	263	3	60	648.557891	138	40	1				
16	626.440742	261	−192	−162	(648.612847)							
17	625.059781	284	−3	4	648.670816	141	−79	−97				
18	623.675557	379	127	120	648.732081	123	158	154				
19	622.287684	365	−132	−136	648.795844	155	−13	0				
20	620.896737	339	−145	−122	648.862609	183	−5	24				
21	(619.502563)				648.932151	175	40	84				
22	618.104503*		−288	−107	649.004247	225	−9	44				
23	616.703374	381	−122	212	649.079087	185	132	185				
24	–				649.155965	268	−145	−102				
25	–				649.235620	288	4	20				
26	–				649.317252	241	−112	−144				
27	–				649.401179	399	−63	−169				
28	–				649.487245	398	113	−99				

Tabelle A.8 $H^{12}CP$ $(030)^{3e,f} \leftarrow (020)^{2e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				–				687.088256	36	43	−24
3	–				683.085637*		279	−108	688.424600	34	11	−60
4	–				683.087642	52	130	−235	689.761488	32	57	−18
5	676.416507*		239	202	683.090235	41	48	−291	691.098800	33	87	10
6	675.084938	205	95	59	683.093507	36	137	−172	692.436561	31	155	75
7	673.754336*		327	294	683.097384*		337	60	693.774748*		267	185
8	672.424066*		303	270	683.101592*		391	149	695.113292*		387	306
9	671.094076	117	−27	−59	683.106376*		563	356	696.452195*		554	475
10	669.765171	148	148	117	683.111036*		174	2	697.790842*		191	114
11	668.436450	161	−65	−95	683.116416	45	93	−45	699.129954	57	58	−14
12	667.108629	157	62	32	683.122203	44	31	−75	700.469353	62	22	−44
13	665.781173	137	6	−24	683.128410	44	32	−46	701.808989	67	78	19
14	664.454382	147	83	53	(683.134913)				703.148612	64	23	−27
15	663.127873	124	−71	−102	(683.141744)				704.488342	80	28	−11
16	661.802105	139	22	−10	(683.148835)				705.828086	74	55	26
17	660.476705	127	14	−20	683.156170	49	20	6	707.167712	93	25	8
18	659.151803	139	59	23	683.163655	53	4	−9	708.507250	92	28	22
19	657.827226	139	12	−26	(683.171297)				709.846526	103	−50	−44
20	656.503005	151	−64	−106	683.179095	55	49	22	711.185658	114	−27	−11
21	655.179336	199	58	11	683.186831	65	−23	−63	712.524447	130	−38	−13
22	653.855769	157	−36	−88	683.194577	75	−98	−152	713.862907	154	0	32
23	652.532934*		321	264	683.202498	81	35	−32	715.200830	180	−50	−13
24	651.209909	152	247	185	683.210127	88	−42	−116	716.538347	218	14	54
25	649.886919	212	9	−57	(683.217744)				717.875170	220	−19	21
26	648.563876*		−437	−506	683.225098	121	−39	−89	719.211217	327	−154	−117
27	647.241755	349	−71	−138	(683.232298)				720.546775	104	−26	6
28	(645.919400)				(683.239174)				721.881342	568	−55	−29
29	644.597116	364	130	84	(683.245713)				723.215764*		688	709
30	–				683.251667	200	−195	188	724.547731*		−21	−4
31	–				683.257426*		−144	497	–			

Tabelle A.9 $H^{12}CP$ $(030)^{3e,f} \leftarrow (020)^{2f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				–				687.088 256	36	39	62
3	–				683.085 637*		261	512	688.424 600	34	−7	25
4	–				683.087 642	52	75	309	689.761 488	32	3	44
5	676.416 507	491	112	91	683.090 235	41	−79	134	691.098 800	33	−40	11
6	675.084 938	205	−160	−182	683.093 507	36	−117	71	692.436 561	31	−101	−41
7	673.754 336	167	−132	−153	683.097 384	25	−121	42	693.774 748	31	−194	−126
8	672.424 066*		−463	−483	683.101 592*		−371	−237	695.113 292*		−381	−306
9	(671.095 306)				683.106 376*		−634	−529	696.452 195*		−654	−574
10	669.766 840	190	11	−7	683.112 631	45	−25	51	697.792 404	59	−61	22
11	668.439 101	159	−23	−40	683.118 876	46	−37	11	699.132 531	56	14	98
12	667.112 219	188	−2	−18	683.125 847	42	54	75	700.472 877	43	−127	−45
13	665.786 106	133	−46	−61	683.133 742*		431	428	701.813 943	69	17	96
14	664.461 010	169	61	46	(683.141 482)				703.155 232	63	−49	23
15	663.136 784	118	138	124	(683.150 322)				704.497 121	80	47	111
16	661.813 204	127	−74	−88	683.159 887	49	40	−15	705.839 289	75	−17	35
17	660.491 191*		310	296	–				707.182 054	95	70	110
18	659.169 483	136	−10	−25	683.181 054	54	24	−42	708.525 087	101	−26	−1
19	657.849 162	146	7	−6	683.192 763	54	38	−27	709.868 644	110	−58	−46
20	(656.529 906)				683.205 210	62	26	−33	711.212 723	118	−37	−38
21	655.211 516*		−273	−278	–				712.557 196	135	−103	−114
22	653.894 831	155	−18	−12	–				713.902 295	146	−35	−52
23	652.579 119	185	−11	10	683.247 276	77	−86	−104	715.247 814	169	−55	−71
24	651.264 535	217	−146	−102	683.263 052	72	−46	−48	716.593 956	200	24	19
25	(649.951 549)				683.279 771	81	59	70	–			
26	648.639 760	278	−26	97	683.297 283	119	53	74	–			
27	647.329 317	446	−126	59	683.315 828	106	151	175	–			
28	(646.020 575)				–				–			
29	644.713 029	417	−209	162	683.355 524	159	62	52	–			
30	–				683.376 835	248	−18	−74	–			
31	–				683.399 281*		2	−127	–			

Tabelle A.10 $H^{12}CP$ $(040)^{0e} \leftarrow (030)^{1f}$

	Q-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
5	653.011 300	309		461
6	–			
7	652.966 723	617		–403
8	652.939 957	617		–516
9	652.910 314	619		–400
10	652.878 847	310		917
11	652.842 583	310		375
12	652.803 221	310		–425
13	652.759 900*	310		–2450

Tabelle A.11 $H^{12}CP$ $(040)^{2e} \leftarrow (030)^{1f}$

	Q-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
6	670.482 641	674	625	197
7	–			
8	670.438 629	674	447	197
9	670.412 062	674	–211	–380
10	670.383 640	673	–194	–292
11	670.352 092*		–884	–925
12	–			
13	670.284 696	673	178	200
14	670.247 241	673	35	62
15	670.208 007	673	–49	–31
16	670.167 528	674	284	281
17	–			
18	670.081 157	674	–268	–308
19	–			
20	669.991 477	338	6	18

Tabelle A.12 $H^{12}CP$ $(040)^{2f} \leftarrow (030)^{1e}$

	Q-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	670.565 367	676	–86	90
4	670.579 346	676	82	240
5	670.595 967	676	–567	–429
6	–			
7	670.641 071	676	–391	–299
8	670.669 993*		863	932
9	670.700 326	338	52	100
10	670.734 919	338	19	49
11	670.773 253	677	240	255
12	670.814 302	677	–318	–313
13	670.859 658	678	–69	–69
14	–			
15	–			
16	671.015 946	677	–170	–161
17	671.074 774	676	–515	–498
18	671.138 635	676	643	664
19	671.204 246	673	15	33
20	–			
21	671.347 257	673	–75	–106

Tabelle A.13 $H^{12}CP\ (040)^{4e} \leftarrow (030)^{3e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	–				–				.		–	
4	–				–				.		–	
5	–				–				695.929953	218	74	92
6	–				–				697.266659	217	–97	–91
7	–				687.923799	220	76	12	698.603735	217	–119	–111
8	–				687.926476	220	55	–3	699.941201	220	47	64
9	–				687.929471	220	22	–29	(701.278672)			
10	–				687.932707	220	–98	–142	(702.616291)			
11	–				687.936540	220	55	18	703.954034	222	–56	3
12	–				687.940498	220	10	–19	705.291939	223	–80	–7
13	–				687.945008*		200	178	(706.630058)			
14	–				687.949517	220	74	59	(707.968190)			
15	–				687.954277	220	–112	–121	709.306358	340	–38	100
16	–				687.959787	220	146	142	.			
17	–				687.965275	220	81	81	(711.982731)			
18	–				687.970917	220	–128	–125	(713.320520)			
19	–				687.977192	220	3	8	(714.659084)			
20	–				687.983651	329	33	36	(715.997728)			
21	–				687.990412	329	83	84	(717.335726)			
22	–				687.997349	329	34	29	(718.673776)			
23	–				688.004492	329	–78	–91	(720.011711)			

Tabelle A.14 $H^{12}CP\ (040)^{0e} \leftarrow (020)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–			1140	1322.702113	14364	–116	153
3	–			–282	1324.038750	10773	198	430
4	–				1325.375299	11012	–10	178
5	1312.030948	7481	–112	10	1326.712141	5327	–313	–171
6	1310.700300	8559	439	497	1328.050434	8858	499	595
7	1309.369415	5027	143	135	1329.387511	4309	–183	–130
8	–				–			
9	1306.709685	4429	–198	–326	1332.063595	4369	–194	–201
10	1305.381413	4070	369	195	1333.401975	3591	–3	–22
11	1304.052845	3950	108	–98	1334.740040	2633	–112	–132
12	1302.724904	3830	–24	–247	1336.078442	4728	223	214
13	1301.397603	4309	31	–193	1337.415830	3711	–250	–240
14	1300.070956	3771	335	127	–			562
15	1298.745170*		1157	977	–			
16	–				1341.426431*		–874	–833
17	–				1342.762745	5267	–429	–428
18	–				1344.098175	4848	–29	–125
19	–				1345.432311	5267	71	–204
20	–				1346.765063	4788	–51	–617
21	–				1348.097095	6105	448	–558
22	–				1349.428435*		1788	151

Tabelle A.15 $H^{12}CP$ $(040)^{2e} \leftarrow (020)^{2e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	–				1324.021 896	14364	−198	−54
4	1313.345 516	14304	−11	289	1325.359 070	7362	−259	−159
5	1312.013 704	6464	−69	224	1326.697 193	6105	9	60
6	1310.682 776	4309	34	310	1328.035 434	5566	−252	−258
7	–				1329.373 725*		−1145	−1214
8	1308.022 649	3411	−394	−181	–			
9	1306.694 030	3411	−462	−298	–			
10	1305.365 979*		−918	−816	–			
11	1304.039 030*		−1306	−1276	–			
12	–				–			
13	1301.390 629	6105	−35	−176	1337.427 968	5506	740	238
14	–				1338.773 535	7122	709	171
15	–				1340.119 795	6165	117	−423
16	1297.426 469	5506	149	−241	1341.468 408	10773	514	19
17	–				–			
18	1294.792 317	8559	709	264	1344.169 342	8678	416	233
19	1293.477 765	6404	638	241	–			
20	1292.164 838	7062	65	−205	1346.875 705*		−1320	−738
21	1290.854 920	11072	201	160	1348.232 734*		−1381	−175
22	1289.546 694	14244	−450	−131	–			
23	–				1350.952 177*		−3082	39
24	–				1352.315 519*		−4177	318
25	–				1353.680 507*		−6475	−266

Tabelle A.16 $H^{12}CP$ $(002)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				2547.833 586	1064	537	487
2	–				2549.122 132	949	264	210
3	–				2550.396 054	900	18	−40
4	2539.793 568	916	28	19	2551.655 520	843	−12	−72
5	2538.402 218	835	−456	−456	2552.900 362	769	31	−31
6	2536.997 353	802	65	76	2554.130 637	761	227	164
7	2535.577 311	728	−80	−59	2555.345 790	712	48	−16
8	2534.142 701	745	−293	−261	2556.546 431	695	130	66
9	2532.694 133	695	30	72	2557.732 006	679	−52	−116
10	2531.230 887	695	161	213	2558.903 124	679	139	75
11	2529.752 685	646	−183	−121	2560.058 898	679	−152	−217
12	2528.260 635	663	100	172	2561.200 327	655	103	39
13	2526.753 630	695	−99	−18	2562.326 413	679	−59	−124
14	2525.232 169	614	−284	−195	2563.437 820	695	57	−8
15	–				2564.534 271	720	209	143
16	2522.146 373	720	−122	−22	2565.615 380	736	46	−21
17	2520.581 762	736	−52	52	2566.681 699	712	155	87
18	2519.002 639	745	−24	83	2567.733 008	736	353	284
19	2517.408 948	761	−92	15	2568.768 586	761	−43	−115
20	2515.800 856	761	−87	18	2569.789 374	843	−56	−131
21	2514.178 141	818	−227	−126	2570.795 041	867	23	−56
22	2512.541 079	835	−233	−138	2571.785 420	925	65	−19
23	2510.890 004	884	236	321	2572.760 180	941	−223	−312
24	2509.223 807	867	73	147	2573.720 039	965	−82	−178
25	2507.543 154	867	−48	10	2574.664 444	982	−25	−130
26	2505.847 988	916	−179	−141	2575.593 728	875	321	204
27	2504.138 642	916	20	32	2576.507 170	1129	275	142
28	2502.414 452	925	−110	−128	2577.404 936	1105	43	−109
29	2500.675 915	826	−64	−120	–			
30	2498.923 143	965	277	175	2579.153 388*		−866	−1077
31	–				2580.005 402	1309	−135	−388
32	–				2580.840 854	1317	−312	−620

Tabelle A.17 $H^{12}CP$ $(021)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				2602.942 042	1686	504	104
3	–				2604.256 344	1587	419	68
4	–				2605.566 104	1555	444	150
5	–				2606.870 768	1497	69	−161
6	–				–			
7	–				2609.465 750*		−732	−828
8	2588.183 342	1203	−234	−312	2610.757 286	1440	179	147
9	2586.814 924	1268	81	78	2612.042 785	1497	−14	10
10	–				2613.323 465	1448	−21	48
11	2584.063 298	1178	−311	−185	–			
12	2582.680 644	1154	−392	−218	–			
13	2581.293 670	1154	−97	110	2617.134 819	1424	121	237
14	2579.901 545	1129	−207	15	2618.394 284	1473	−235	−138
15	2578.505 653*		720	935	2619.648 709	1571	−176	−116
16	2577.103 391	1145	140	329	–			
17	2575.696 421	1121	−215	−74	2622.140 554	1694	−266	−321
18	–				2623.377 697*		−463	−584
19	–				2624.610 631*		1045	863
20	2571.446 653	1219	205	115	2625.835 034	1301	62	−162
21	2570.019 632	1088	306	132	2627.054 729	1808	546	315
22	2568.587 902*		1048	803	2628.267 279	1653	197	14
23	2567.148 418*		−515	−800	–			
24	2565.705 722	1162	262	−13	–			
25	2564.257 597*		1272	1083	–			
26	2562.800 997	1203	−417	−415	–			
27	2561.340 520	1178	−89	245	–			

Tabelle A.18 $H^{12}CP$ $(021)^{2e} \leftarrow (011)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	–				676.887 291	673	−37	−47
4	666.274 517	67627	−413	−366	–			
5	–				679.570 486	673	−82	−14
6	–				680.916 775	673	110	226
7	662.346 847	677	601	775	682.265 106	671	−643	−474
8	661.042 222*		−853	−641	683.616 412*		−1409	−1186
9	659.743 509	679	351	593	684.972 287	660	−602	−327
10	658.446 098	682	−437	−176	686.330 671	659	−291	33
11	657.152 808	679	−440	−175	687.692 255	658	204	569
12	655.862 727	679	−613	−367	689.055 837	656	−334	59
13	654.577 756*		895	1097	690.422 220*		−1120	−713
14	653.294 024	67663	165	291	691.793 251	652	−326	74
15	652.014 526	678	137	150	693.167 142	652	235	605
16	650.738 702	679	196	53	694.542 819	65173	−534	−225
17	649.467 096*		829	478	695.922 159*		−787	−573
18	648.198 286	674	550	−64	697.305 780	649	64	143
19	646.932 880	67313	−94	−1037	698.691 498	652	−199	−302
20	645.673 173*		1124	−219	–			
21	644.417 078*		2049	225	701.473 096*		−344	−979
22	643.162 232	66998	244	−2149	702.869 546	66323	262	−736
23	–				704.269 179	66523	678	−758
24	–				705.670 660*		−478	−2437

Tabelle A.19 $H^{12}CP$ $(021)^{2f} \leftarrow (011)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	670.228174	67193	−82	181	–			
2	–				675.540072	673	356	602
3	–				676.867211*		853	1063
4	666.241422*		1357	1481	–			
5	664.909691	67574	−198	−143	679.517449	673	−585	−462
6	663.579213	226	−139	−158	680.843509	673	485	563
7	–				682.168794*		1375	1412
8	–				683.491013	667	−185	−178
9	659.586396	341	663	423	684.814040	661	−297	−306
10	658.253479	679	−428	−727	686.136330	659	−482	−491
11	656.922453	678	657	315	687.459106	658	507	517
12	655.588300*		−1113	−1480	688.780211	655	537	586
13	654.257384	678	614	240	690.099562	658	−450	−342
14	652.923079*		−800	−1161	691.419637	653	50	233
15	651.590840	680	86	−241	692.737860	650	−513	−245
16	–				694.055287*		−1057	−702
17	648.923635	673	−203	−428	695.372959	650	−512	−84
18	–				696.690003	652	274	748
19	646.256510	672	406	274	698.004160*		−928	−461
20	644.922065	673	113	−14	699.320318*		799	1178
21	643.587624	67075	4	−177	700.632837	659	−157	20
22	–				701.945542	662	59	−122
23	640.919154*		707	120	–			
24	639.583612	67075	−5	−1025	–			
25	–				705.878345*		1622	−1116
26	–				–			
27	–				708.494872*		2827	−3561
28	–				709.802053*		4097	−4970
29	–				–			
30	–				712.413595*		7483	−9228
31	–				–			
32	–				715.017948*		8803	−19542

Tabelle A.20 $H^{12}CP$ $(011)^{1e,f} \leftarrow (001)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				–				668.547997*		−400	−461
1	–				667.226390*		−98	−151	669.873009	298	−122	−177
2	–				667.232794	154	−22	−70	671.197528	165	20	−28
3	663.246434	116	188	113	667.242246	111	−58	−99	672.521515	163	7	−34
4	661.919948	212	−44	−119	667.254891	73	−59	−91	673.845137	120	24	−9
5	660.593547	150	64	−11	667.270758	68	10	−11	675.168318	114	15	−10
6	659.266821	142	84	12	667.289662	63	−30	−40	676.491123	98	65	48
7	657.939795	113	27	−42	667.311775	56	−1	1	677.813353	91	−5	−13
8	656.612628	97	37	−28	667.336970	52	−20	−7	679.135161	99	−21	−21
9	655.285202	100	−20	−78	(667.365326)				680.456483	80	−25	−18
10	653.957713	78	40	−12	667.396731	52	−42	−8	681.777280	81	−35	−21
11	652.630156	62	196	152	667.431313	49	−6	35	(683.097581)			
12	651.302100	70	6	−30	667.468945	47	−6	39	(684.417284)			
13	649.974056	82	−33	−60	667.509646	47	−10	36	685.736389	75	−12	15
14	648.645946	85	−12	−30	667.553410	48	−10	35	687.054870	80	−38	−10
15	647.317661	86	−51	−60	667.600163	46	−62	−24	688.372788	73	5	33
16	645.989420	85	58	58	667.650029	52	−28	1	689.689947	80	−54	−28
17	644.660890	89	−30	−23	667.702958	47	60	76	691.006599	89	61	83
18	643.332330	101	−67	−53	667.758799	53	70	71	692.322321	91	−49	−33
19	642.003777	104	−26	−6	667.817480	54	−50	−69	693.637452	107	−18	−10
20	640.675116	123	−32	−7	667.879294	58	10	−28	694.951796	112	−19	−21
21	639.346408	147	−33	−6	667.944019	66	51	−6	(696.265378)			
22	638.017723	132	32	58	668.011548	73	−14	−88	697.578120	140	−13	−42
23	636.688537*		−370	−348	668.082049	80	5	−81	698.890175	157	122	76
24	(635.360096)				668.155392	84	0	−89	700.201132	170	19	−45
25	634.031366	219	98	101	668.231693	102	110	28	–			
26	632.702479	229	50	38	668.310629	114	36	−22	–			
27	631.374072*		485	454	668.392343	121	−56	−71	–			
28	630.044688	285	−59	−116	668.476934	161	−42	13	–			
29	(628.715917)			424	668.564248	207	−52	105	–			
30	628.716429*			270	668.654228	267	−119	180	–			
31	627.387496*			342	668.747024	338	−67	422	–			
32	626.058817*			159	668.842306	434	−201	534	–			
33	624.729915*				668.940257	731	−313	735	–			

Tabelle A.21 $H^{12}CP$ $(011)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				1275.422581*		−550	−495
3	–				1276.727551	279	51	109
4	1266.099723	252	−89	−26	1278.024719	221	−211	−148
5	1264.740456	221	−124	−55	1279.315614*		219	286
6	1263.374471	228	−90	−14	1280.598809	180	−68	5
7	1262.001649	184	−116	−33	1281.875330	180	−20	58
8	1260.622118	187	−89	2	1283.144610	177	−181	−99
9	1259.235813	187	−81	18	1284.407027	156	−147	−62
10	1257.842840	170	1	107	1285.662544	150	69	157
11	1256.442942	170	−108	4	1286.910666	156	1	90
12	1255.036378	184	−155	−39	1288.151487	143	−232	−144
13	1253.623205	170	−93	25	1289.385573	153	−33	51
14	1252.203198	187	−152	−33	1290.612236	153	−63	15
15	1250.776512	187	−184	−67	–			
16	1249.343316	173	−24	89	1293.044052	167	71	129
17	1247.903175*		−111	−6	1294.248747	167	−161	−116
18	1246.456385	194	−154	−58	1295.446490	201	−27	2
19	1245.003015	214	−83	−1	1296.636621	197	−153	−142
20	1243.542806	238	−162	−97	1297.819744	204	97	89
21	1242.076231	275	82	128	1298.995072	221	−30	−57
22	–				1300.163188	252	84	38
23	–				–			
24	–				1302.476756	340	150	72
25	–				1303.622129	333	94	7

Tabelle A.22 $H^{12}CP$ $(011)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	1267.443050	330	−85	−189	1276.742739	326	−44	−114
4	1266.088210	252	91	−3	1278.044631	245	47	−6
5	1264.726390	221	−132	−214	1279.339789	221	152	118
6	1263.358466	228	107	41	1280.628011	197	93	79
7	–				1281.909444	201	48	54
8	1260.602369	187	6	−25	1283.184028	163	−17	8
9	1259.214485	170	−61	−74	1284.451747	167	−86	−43
10	1257.820266	184	74	79	1285.712964	139	235	294
11	1256.419295	170	−8	12	1286.966439	156	−260	−189
12	1255.011915	184	33	67	–			
13	1253.597820	170	−112	−67	1289.453492	143	−235	−149
14	1252.177348	170	−103	−50	1290.687196*		485	570
15	1250.750552	187	113	169	1291.912446	153	−179	−98
16	1249.316842	173	−50	4	1293.131451	167	19	92
17	1247.876781	190	−28	20	1294.342987	167	−102	−41
18	1246.430194	211	10	48	1295.547600	184	42	88
19	1244.976931	214	−79	−55	1296.744710	197	−84	−54
20	1243.517373	238	90	96	1297.934803	252	45	59
21	1242.050893	275	−100	−112	–			
22	1240.578010	374	−124	−155	1300.292682	289	−6	−9
23	–				1301.460461	286	−103	−103
24	–				1302.621156	340	166	186

Tabelle A.23 $H^{12}CP$ $(020)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				1336.313 874	88	−13	51
1	–				1337.649 682	56	−1	58
2	1332.315 926	52	−22	44	1338.987 036	43	21	72
3	1330.986 496	43	−10	51	1340.325 854	39	−4	38
4	1329.658 654	39	−33	22	1341.666 126	36	−52	−22
5	1328.332 517	36	22	68	1343.007 926	36	−19	−1
6	1327.007 941	36	7	42	1344.351 125	36	9	12
7	1325.685 027	36	22	46	1345.695 672	36	19	9
8	1324.363 697	36	−3	9	1347.041 524	36	13	−11
9	1323.044 023	36	8	8	1348.388 695	36	55	19
10	1321.725 947	36	11	−2	1349.737 036	36	47	0
11	1320.409 453	36	3	−21	1351.086 530	36	29	−27
12	1319.094 533	36	−5	−39	1352.437 133	36	15	−49
13	1317.781 166	36	−13	−55	1353.788 774	36	−3	−71
14	1316.469 335	36	−12	−58	1355.141 427	36	13	−55
15	1315.159 001	36	−12	−61	1356.494 992	36	37	−30
16	1313.850 165	36	20	−29	1357.849 364	36	32	−30
17	1312.542 718	36	11	−35	1359.204 495	39	31	−23
18	1311.236 655	36	−4	−44	1360.560 298	39	24	−18
19	1309.931 974	36	13	−17	1361.916 701	39	23	−6
20	1308.628 536	36	−26	−45	1363.273 619	39	30	16
21	1307.326 411	36	−7	−11	1364.630 917	39	−1	2
22	1306.025 457	36	−14	−3	1365.988 611	43	41	60
23	1304.725 663	39	−5	21	1367.346 433	43	−19	18
24	1303.426 937	39	−12	30	1368.704 632*		170	223
25	1302.129 263	39	13	70	1370.062 460	46	−39	27
26	1300.832 503	43	−5	65	1371.420 401	49	−56	21
27	1299.536 634	46	−18	62	1372.778 255	52	26	109
28	1298.241 578	49	−34	51	1374.135 752	59	47	134
29	1296.947 264	56	−48	37	1375.492 671	62	−100	−15
30	1295.653 679	62	1	80	1376.849 171	72	−143	−63
31	1294.360 625	37	−4	64	1378.205 200	41	−14	56
32	1293.068 067	37	−17	32	1379.560 075*		−280	−222
33	1291.775 952	37	−7	19	1380.914 562	44	−52	−6
34	1290.484 020*		−149	−153	1382.267 789	48	−82	−46
35	1289.192 596	41	−31	−66	1383.619 929	51	−71	−38
36	1287.901 301	44	57	−11	1384.970 778	58	−100	−59
37	1286.609 908	51	−21	−118	1386.320 233	65	−147	−78
38	1285.318 580	58	−12	−132	1387.668 250	78	−129	−8
39	1284.027 084	71	−57	−184	1389.014 676	85	−74	136
40	1282.735 527	82	42	−71	–			
41	1281.443 655	92	126	59	–			
42	1280.151 251	126	69	89	–			
43	1278.858 445	150	94	258	–			
44	1277.565 086	197	141	520	–			
45	1276.270 854	194	−19	665	–			

Tabelle A.24 $H^{12}CP\ (030)^{1e,f} \leftarrow (010)^{1e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				1326.594574	170	−242	22	1329.250765*		−438	−437
2	–			−3296	1326.606547	292	−221	−99	1330.581512	398	−81	−84
3	1322.591627	221	22	47	1326.624716	405	23	32	1331.911344	333	−84	−91
4	1321.257935*		−338	−308	1326.648578	340	−13	32	1333.240839	252	149	139
5	1319.924429	252	−79	−43	–				1334.569493	221	137	125
6	1318.590111	218	−210	−168	–			−9	1335.897513	201	109	94
7	1317.255525	224	−201	−154	–			3017	1337.224673	180	−139	−156
8	1315.920726	180	−7	44	–			6384	1338.552242*		688	668
9	1314.585252	180	−104	−48	–				1339.877837	153	228	206
10	1313.249586	167	−17	42	–				1341.202956	153	9	−16
11	1311.913374	163	−109	−47	–				1342.527383	156	−163	−190
12	1310.576780*		−226	−163	–			66924	1343.851440	153	65	35
13	1309.240140	163	−38	25	–				1345.174410	156	0	−31
14	1307.903062	153	54	116	–				1346.496552	156	−66	−100
15	1306.565343	180	−156	−97	–				1347.818080	170	107	71
16	1305.227948*		288	343	–				1349.138598	170	155	118
17	1303.889528	197	37	86	–				1350.458123	187	126	88
18	1302.551099	177	99	141	–				1351.776593	207	−11	−48
19	1301.212148	201	−39	−5	–				1353.094243	228	13	−21
20	1299.872888	214	−167	−144	–				1354.410685	211	−160	−189
21	1298.533599	248	−8	6	–				1355.726355	262	−57	−76
22	1297.193677	245	−163	−160	–				1357.040980	262	82	76
23	1295.853383*		−375	−382	–				1358.354233	299	−33	−21
24	1294.513363	282	5	−10	–				1359.666598	299	114	153
25	1293.172568	384	−71	−93	–				–			
26	1291.831737	282	137	113	–				–			

Tabelle A.25 $H^{12}CP\ (030)^{1e,f} \leftarrow (010)^{1f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				1326.585070*		−12	−109	1329.267096	946	−267	−29
2	1323.921171	481	−7		1326.577338*		−227	−26	1330.610475	383	−179	−64
3	1322.591627*		164	126	1326.566840*		553	1028	1331.956824*		218	86
4	1321.264704	272	191	102	1326.550833*		−415	158	1333.305323	239	124	143
5	1319.940335	242	−10	−16	1326.531789*		−654	−279	1334.656030	213	−387	−246
6	1318.618661	236	−313	14	1326.510222*		352	226	1336.010407	177	171	97
7	1317.300358	193	−57	−7	1326.483155*		−369	−1105	1337.366755	160	116	9
8	1315.984441	173	−240	36	1326.454489*		1088	144	1338.725490	160	−113	2
9	1314.671620	173	−169	−67	1326.419183*		−312	−107	1340.087060	180	−47	5
10	1313.361806	160	56	32	–				1341.451222	137	95	52
11	1312.054488	160	−88	−25	–				1342.817682	151	40	40
12	1310.750169	147	−112	−35	–				1344.183306*		−3321	−2011
13	1309.448807	147	−67	−13	–				1345.557945	151	−112	−33
14	1308.150208	160	−160	7	–				1346.931031*		−875	−741
15	1306.854720	144	−49	11	–				1348.308617*		470	366
16	1305.562021	160	−67	−10	–				1349.686626	154	−128	1
17	1304.272282	170	−49	18	–				1351.066952*		−743	−836
18	1302.985357	173	−149	−9	–				1352.451018	200	77	−71
19	1301.701596	190	−20	−30	–				1353.836763*		304	88
20	1300.420691	209	25	−7	–				1355.224263	223	45	29
21	1299.142524	213	−134	24	–				1356.614110	71	−70	−35
22	1297.867615	206	22	119	–				1358.006474*		163	194
23	1296.595418	61	−52	0	–				1359.400788*		218	242
24	1295.326599*		311	353	–				1360.797458*		540	555
25	1294.059974	75	−66	−38	–				1362.195304	95	−10	−7
26	1292.796697	85	−26	−16	–				1363.595715	68	3	−9
27	1291.536354	92	28	15	–				1364.998206	119	140	109
28	1290.278813	99	−28	−69	–				–			
29	1289.024320	112	66	−8	–				–			

Tabelle A.26 $H^{12}CP$ $(001)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				1279.603 507	105	66	73
1	1276.945 308	105	−87	−82	1280.921 514	58	−47	−37
2	1275.605 447	61	−55	−51	1282.232 376	48	−11	1
3	1274.258 396	48	12	15	1283.535 902	41	0	16
4	1272.904 019	41	−40	−36	1284.832 099	41	15	33
5	1271.542 552	37	13	18	1286.120 938	37	22	43
6	1270.173 785	37	−55	−49	1287.402 652*		276	300
7	1268.798 011	37	35	42	1288.676 449	37	5	33
8	1267.414 972	37	13	22	1289.943 143	34	47	77
9	1266.024 836	37	32	43	1291.202 313	37	1	33
10	1264.627 511	37	−10	4	1292.454 108	34	39	73
11	1263.223 105	37	−18	−1	1293.698 346	37	3	38
12	1261.811 599	37	−20	−1	1294.935 118	37	7	43
13	1260.393 030	37	8	29	1296.164 460	37	113	148
14	1258.967 340	37	0	22	1297.386 056	37	27	61
15	1257.534 556	37	−27	−3	1298.600 134	37	5	36
16	1256.094 783	37	22	47	1299.806 635	37	11	40
17	1254.647 882	37	1	28	1301.005 483	37	−3	22
18	1253.193 915	37	−37	−10	1302.196 693	37	6	25
19	1251.732 978	41	−3	25	1303.380 200	37	−4	10
20	1250.264 970	41	−6	21	1304.556 030	37	25	32
21	1248.789 911	44	−32	−5	1305.724 079	37	12	12
22	1247.307 892	44	5	30	1306.884 349	41	−10	−17
23	1245.818 777	48	−40	−16	1308.036 872	41	18	3
24	1244.322 692	51	−44	−22	1309.181 521	44	−1	−24
25	1242.819 595	58	−57	−36	1310.318 332	44	−4	−34
26	1241.309 526	61	−42	−23	1311.447 737*		472	436
27	1239.792 486	71	−3	16	1312.568 249	51	−32	−74
28	1238.268 437	82	17	35	1313.681 347	58	−7	−53
29	1236.737 353	95	−11	7	1314.786 494	65	39	−9
30	1235.199 372	116	44	64	1315.883 596	71	42	−6
31	1233.654 306	136	−7	15	1316.972 428*		−191	−236
32	1232.102 135	150	−188	−162	1318.053 681	95	59	20
33	1230.543 392	177	29	61	1319.126 564	116	33	2
34	1228.977 411	224	−25	14	1320.191 389	136	71	53
35	–				1321.247 922	160	−29	−29
36	–				1322.296 486	204	86	107
37	–				1323.336 495	207	−140	−94

Tabelle A.27 $H^{12}CP$ $(100)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				3218.215 456	56	−30	−38
1	3215.556 510	56	−30	−38	3219.535 329	32	−75	−82
2	3214.217 542	32	−4	−11	3220.848 924	26	−5	−13
3	3212.872 228	26	1	−5	3222.156 047	22	1	−6
4	3211.520 593	22	−8	−13	3223.456 733	22	−5	−11
5	3210.162 686	22	2	−1	3224.750 993	20	5	−1
6	3208.798 497	20	3	1	3226.038 787	20	6	1
7	3207.428 058	20	10	10	3227.320 108	20	7	3
8	3206.051 372	20	7	9	3228.594 937	20	6	3
9	3204.668 460	20	−1	3	–			
10	3203.279 367	20	11	18	3231.125 071	20	12	9
11	3201.884 075	20	10	18	3232.380 328	20	1	−1
12	3200.482 609	20	0	10	3233.629 055	20	12	10
13	3199.074 996	20	−9	3	3234.871 195	20	3	1
14	3197.661 271	20	−1	13	3236.106 781	20	22	19
15	3196.241 404	20	−23	−8	3237.335 728	20	−1	−6
16	3194.815 482	20	−9	7	3238.558 090	20	2	−4
17	3193.383 476	20	−4	12	3239.773 825	20	5	−4
18	3191.945 414	20	−2	14	3240.982 919	20	7	−4
19	3190.501 297	20	−19	−4	3242.185 368	20	19	6
20	3189.051 182	20	−19	−4	3243.381 129	22	12	−4
21	3187.595 114	22	26	39	3244.570 209	22	7	−13
22	3186.132 924	22	−75	−64	3245.752 603	22	13	−10
23	3184.664 943	22	−9	−2	3246.928 282	24	13	−13
24	3183.190 966	24	−3	2	3248.097 240	24	16	−12
25	3181.711 062	24	−6	−5	3249.259 461	26	19	−11
26	3180.225 260	26	−10	−14	3250.414 942	28	32	0
27	3178.733 604	28	9	0	3251.563 647	32	31	0

... *Fortsetzung auf der nächsten Seite*

Tabelle A.27 Fortsetzung von $H^{12}CP$ $(100)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
28	3177.235 965	30	−100	−114	3252.705 602	220	55	25
29	3175.732 745	240	45	26	3253.840 753	220	62	36
30	3174.223 574	220	54	29	3254.969 082	220	47	27
31	3172.708 440	220	−109	−138	3256.090 602	220	33	23
32	3171.187 858	220	52	18	3257.205 303	220	24	27
33	3169.661 466	220	153	116	3258.313 066	240	−90	−68
34	3168.129 142	220	48	10	3259.414 051	260	−136	−91
35	3166.591 220	240	52	13	3260.508 314	280	−49	26
36	3165.047 603	280	43	7	3261.595 593	320	−78	34
37	3163.498 311	300	19	−10	–			
38	3161.943 375	360	−11	−31	–			
39	3160.382 873	420	7	1	–			
40	3158.816 724	520	−31	−17	–			
41	3157.244 975	620	−102	−63	–			
42	3155.667 732	820	−124	−52	–			
43	3154.084 906	1000	−210	−97	–			
44	3152.496 943*		60	224	–			

Tabelle A.28 $H^{12}CP$ $(110)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				–			
3	–				3205.539 950*		−359	−363
4	–				3206.840 728	40	−33	−35
5	3193.553 416	37	27	21	3208.134 853	33	−12	−14
6	3192.190 427	34	35	29	3209.422 606	30	−1	−2
7	3190.821 233	30	−2	−8	3210.703 998	28	28	28
8	3189.445 949	28	12	7	3211.978 933	26	−4	−4
9	3188.064 508	27	−6	−11	3213.247 502	25	9	9
10	3186.676 989	25	4	0	3214.509 619	24	−4	−3
11	3185.283 351	25	−17	−20	3215.765 306	24	−5	−3
12	3183.883 722	25	41	38	3217.014 544	24	4	6
13	3182.477 915	25	−28	−30	3218.257 307	24	11	13
14	3181.066 185	25	13	12	3219.493 502	25	−62	−60
15	3179.648 358	25	−28	−29	3220.723 392	26	64	66
16	3178.224 583	26	−22	−22	3221.946 554	28	−20	−18
17	3176.794 849	27	2	2	3223.163 279	29	−7	−5
18	3175.359 116	28	−15	−14	3224.373 456	30	6	8
19	3173.917 459	29	−17	−16	–			
20	3172.470 037	31	135	136	3226.774 656*		579	582
21	3171.016 409	34	−18	−18	3227.964 510	37	0	3
22	–				–			
23	3168.091 815	40	−40	−42	3230.325 458	45	−88	−84
24	3166.620 741	46	−56	−60	3231.496 174	35	54	59
25	3165.143 856	50	−62	−67	3232.659 976	58	−72	−65
26	3163.661 373	54	137	129	3233.817 276	64	−39	−30
27	3162.172 813	65	39	29	3234.967 448*		−460	−447
28	3160.678 616	72	67	53	–			
29	3159.178 602	81	18	0	3237.248 946	107	−72	−49
30	3157.672 913	93	14	−8	3238.379 509	128	0	30
31	3156.161 485	109	−28	−56	3239.503 280	161	6	45
32	3154.644 437	131	−12	−45	3240.620 271	161	−29	21
33	3153.121 630	164	−96	−135	–			
34	3151.593 442	164	76	30	–			
35	3150.059 439	219	49	−4	3243.930 746	322	−72	27
36	–				3245.020 718	322	−46	76
37	3146.974 932*		257	188	3246.103 963	646	54	202
38	–				3247.180 376	646	133	313
39	3143.867 787	221	33	−53	–			
40	–				3249.313 021*		593	851
41	3140.738 713	665	−88	−191	3250.368 271	648	13	320

Tabelle A.29 $H^{12}CP$ $(110)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				–			
3	–				3205.554 217*		347	352
4	–				3206.857 888	40	47	54
5	3193.537 486	37	−124	−126	3208.155 516	33	1	8
6	3192.171 665	30	50	48	3209.446 901	30	24	31
7	3190.799 532	29	19	16	3210.731 748	25	−163	−155
8	3189.421 330	28	7	4	3212.010 606	26	6	14
9	3188.037 080	26	19	15	3213.282 979	25	50	59
10	3186.646 757	25	10	6	3214.548 877	24	−3	6
11	3185.250 490	24	91	88	3215.808 467	24	28	37
12	3183.848 037	25	3	−1	–			
13	3182.439 685	25	14	10	3218.307 812*		−503	−496
14	3181.025 323	25	−7	−10	–			
15	3179.604 892	21	−136	−139	3220.782 425	26	−9	−2
16	3178.179 164*		380	377	3222.009 782	28	−13	−8
17	3176.746 611	27	−6	−10	3223.231 118*		447	451
18	3175.308 544	28	−3	−6	3224.445 041	30	−6	−3
19	3173.864 767	29	174	171	3225.652 924	33	16	18
20	3172.414 737	32	−36	−39	3226.854 215	35	−24	−23
21	–				3228.048 510*		−515	−515
22	3169.497 714	36	100	96	3229.237 261	42	9	8
23	3168.030 056*		−260	−263	3230.418 913	45	7	5
24	3166.557 185	46	−45	−49	3231.593 958	53	−15	−16
25	3165.078 328	50	−49	−53	3232.761 950*		−487	−488
26	3163.593 745	54	−32	−37	3233.924 251	64	−36	−36
27	–				3235.079 502	80	−5	−3
28	3160.607 352	72	−64	−71	3236.228 558*		474	479
29	3159.105 657	81	−39	−47	3237.369 986	107	−19	−9
30	3157.598 409	93	99	90	3238.505 177	128	−79	−63
31	3156.085 340	109	62	51	3239.633 888	160	64	88
32	–				–			
33	3153.042 406	164	43	29	–			
34	–				3242.979 378	215	79	141
35	–				3244.081 008	323	2	83
36	–				–			
37	–				3246.264 207	647	40	170

B Tabellen zu $H^{13}CP$

Tabelle B.1 $H^{13}CP$ $(010)^{1e,f} \leftarrow (000)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				–				670.531 302*		395	401
1	–				669.257 070	53	−19	−27	671.806 011	53	−22	−16
2	666.700 392	130	−27	−22	669.261 453	34	24	17	673.080 253	37	−28	−22
3	665.421 873	63	−65	−60	669.267 932	26	−6	−14	674.353 609	34	−27	−20
4	664.142 666	49	9	13	669.276 622	23	6	−1	675.626 082	26	2	8
5	662.862 586	36	−6	−2	669.287 480	20	18	12	676.897 588	28	−11	−5
6	661.581 765	30	8	12	669.300 485	19	11	5	678.168 159	23	−17	−11
7	660.300 173	27	5	8	669.315 637	18	−14	−20	679.437 784	25	−10	−5
8	659.017 856	24	17	19	669.332 991	18	0	−5	680.706 438	21	−1	5
9	657.734 777	23	−9	−8	669.352 501	17	8	4	681.974 096	22	4	9
10	656.451 027	21	3	4	669.374 174	17	20	16	683.240 718	20	−20	−15
11	655.166 572	21	4	5	669.397 964	17	−7	−11	684.506 351	21	−9	−5
12	653.881 434	21	3	3	669.423 947	17	4	1	685.770 943	20	2	5
13	652.595 631	20	2	1	669.452 072	17	6	4	687.034 465	20	0	3
14	651.309 172	21	−5	−6	669.482 342	17	5	4	688.296 922	20	7	9
15	650.022 087	21	−1	−2	669.514 754	17	2	1	689.558 279	20	5	7
16	648.734 376	22	−1	−3	669.549 313	18	4	4	690.818 516	21	−8	−7
17	647.446 066	22	8	5	669.586 008	18	6	6	692.077 658	21	9	9
18	646.157 146	24	0	−2	669.624 834	18	5	6	693.335 627	23	−5	−5
19	644.867 654	24	0	−3	669.665 790	19	6	7	694.592 469	23	14	13
20	643.577 618	28	22	19	669.708 866	20	2	4	695.848 102	25	2	0
21	642.286 987	28	0	−3	669.754 057	20	−5	−4	697.102 560	27	9	7
22	640.995 807	31	−33	−35	669.801 303	19	−72	−70	698.355 774	29	−16	−19
23	639.704 136	33	−32	−35	669.850 794	22	−2	−1	699.607 818	35	20	16
24	638.412 017	37	30	29	669.902 332	24	11	13	700.858 559	35	0	−4
25	637.119 267	40	−41	−41	669.955 971	26	28	29	702.108 048	44	−7	−11

... *Fortsetzung auf der nächsten Seite*

Tabelle B.1 Fortsetzung von $H^{13}CP$ $(010)^{1e,f} \leftarrow (000)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
26	635.826 154	45	9	9	670.011 667	27	11	11	703.356 240	46	−27	−31
27	634.532 603	43	91	92	670.069 483	31	28	28	704.603 178	58	1	−4
28	633.238 424	55	2	5	670.129 351	33	19	19	705.848 741	60	−27	−32
29	631.943 872	70	−16	−12	670.191 277	37	−3	−5	707.092 997	74	−24	−29
30	630.648 859	75	−65	−58	670.255 290	41	−4	−7	708.335 935	85	17	12
31	629.353 547	100	5	15	670.321 314	46	−50	−55	709.577 418	121	−23	−27
32	628.057 753	72	−1	11	670.389 537	54	52	45	710.817 607	119	37	33
33	626.761 534	119	−41	−25	670.459 658	64	10	1	712.056 478	156	190	187
34	625.464 974	166	−42	−23	670.531 302*		−542	−555	713.293 547	182	−29	−31
35	624.167 995	162	−96	−73	670.606 091	100	24	8	714.529 528	243	113	112
36	622.870 997	194	186	214	670.682 310	111	2	−17	715.763 855	295	68	69
37	621.573 085	288	−105	−72	670.760 586	129	30	6	716.996 719	473	47	50
38	620.275 137	288	−102	−63	670.840 658	106	−147	−175	–			
39	618.976 807	287	−164	−119	670.923 158	184	114	81	–			
40	(617.678 398)				671.007 293	299	28	−10	–			
41	(616.379 533)				(671.093 456)				–			
42	615.080 358	262	−28	39	671.181 698	584	88	37	–			

Tabelle B.2 $H^{13}CP$ $(020)^{0e} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	651.315 566	338	−41	0	–				660.263 349*		438	265
4	650.046 459	338	52	102	655.128 989	170	37	−11	661.549 505*		−354	−567
5	648.779 162	337	−326	−273	655.124 877	170	−112	−158	662.839 284	340	366	114
6	647.514 970	224	118	168	655.120 197	137	−4	−48	664.129 961	340	−93	−379
7	646.252 383	224	−116	−77	655.114 524	137	−47	−89	–			
8	644.992 548	226	120	144	655.107 990	114	−88	−127	666.718 659	226	254	−81
9	643.734 496	224	−135	−133	655.100 689	114	−10	−45	668.016 086*		550	205
10	642.479 228	224	128	104	655.092 573	114	166	134	–			
11	–				655.083 436	98	263	234	670.616 049*		573	250
12	–				655.073 085	114	121	95	671.918 138	170	−44	−331
13	638.726 039	169	73	−49	655.061 649	114	−97	−120	673.222 755	226	116	−112
14	637.479 345	169	−1	−159	655.049 459	114	−20	−42	–			
15	636.234 984	228	83	−108	655.036 019	114	−105	−125	675.836 728	224	161	129
16	634.992 498	230	−104	−326	655.021 701	114	66	46	677.145 917	224	7	118
17	633.752 789	232	370	122	655.006 360	114	394	374	–			
18	632.514 498	233	179	−88	654.988 865	137	−201	−224	–			
19	631.278 262	233	−1	−278	654.970 820	137	−62	−91	–			
20	630.044 789*		577	300	654.951 305	170	−54	−90	–			
21	628.812 206	175	83	−179	654.930 515	170	77	31	–			
22	627.581 906	342	−43	−274	654.907 911	170	−146	−205	–			
23	626.353 507	338	−135	−315	654.884 000	227	−151	−227	–			
24	625.127 041	336	−108	−214	654.859 339*		686	590	–			
25	623.902 310	335	−105	−110	654.831 546	227	52	−66	–			
26	622.679 310	668	−72	54	654.802 862	341	263	118	–			
27	–				654.772 431*		537	364	–			
28	–				654.739 644	340	343	141	–			
29	–				654.705 234*		495	263	–			

Tabelle B.3 $H^{13}CP$ $(020)^{2e} \leftarrow (010)^{1f}$

	Q-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
6	673.759 162	749	124	−69
7	673.752 277*		163	−15
8	673.744 492	313	234	71
9	673.735 556	374	62	−84
10	673.725 961	312	113	−15
11	673.715 398	254	51	−60
12	673.704 218	285	193	100
13	673.692 085	274	170	95
14	673.679 084	271	28	−29
15	673.665 434	288	−53	−93
16	673.651 184	370	−68	−92
17	673.636 495	297	98	87
18	673.620 937	434	−34	−33
19	673.605 083	420	57	67
20	–			
21	673.571 740	412	−62	−44
22	673.554 603	671	−37	−23
23	673.537 162	338	−33	−28
24	673.519 546	106	13	3

Tabelle B.4 $H^{13}CP$ $(020)^{2e,f} \leftarrow (010)^{1e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				676.338 698*		630	668
2	–				–				677.620 070	226	36	83
3	–				–				–			
4	–				673.800 094	694	−38	−46	680.189 938	169	58	117
5	–				673.810 360	587	210	188	681.477 592	168	−163	−99
6	–				673.822 299	553	131	94	682.767 098*		−499	−431
7	664.892 110*		774	742	673.836 151	551	−34	−86	684.059 451	167	41	110
8	663.630 554*		583	550	673.852 183	435	−17	−80	685.353 146	166	−55	16
9	662.370 890	227	79	46	673.870 252	376	41	−29	–			
10	661.114 006	340	111	81	673.890 223	287	7	−64	–			
11	659.859 027	227	−237	−259	673.912 254	307	42	−21	689.246 203	164	−334	−269
12	658.606 782	341	−177	−188	673.936 393	296	197	152	–			
13	657.357 161	228	134	139	673.962 115	301	−51	−64	691.852 100	164	−115	−62
14	656.109 571	341	55	81	673.990 127	260	8	45	693.158 116	163	−35	12
15	654.864 865	227	388	440	674.019 925	195	−126	−21	694.466 249	164	66	105
16	653.621 988	341	23	109	–				695.776 360	164	19	50
17	652.382 373	227	337	464	–				697.088 495	218	−159	−136
18	651.145 235*		485	662	–				698.403 271	218	114	130
19	649.909 836	338	−332	−97	–				699.719 967	218	82	90
20	648.678 018	337	−338	−35	–				701.038 844	221	−33	−33
21	–				–				702.360 226	222	51	45
22	–				–				703.684 664*		841	829
23	–				–				705.009 870	335	2	−14
24	–				–				706.338 208	335	−150	−171
25	–				–				707.669 377	672	32	5
26	–				–				709.002 545*		−338	−371
27	–				–				710.338 728*		−301	−343
28	–				–				711.677 907*		67	11
29	–				–				713.019 197*		−182	−256
30	–				–				714.363 724*		18	−86
31	–				–				715.710 390*		−497	−644

Tabelle B.5 $H^{13}CP$ $(020)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
4	1319.293 003*		143	158	–			
5	1318.021 760	170	53	65	–			
6	1316.751 940	148	−49	−33	–			
7	1315.483 716	112	10	31	–			
8	1314.216 718	104	−137	−106	–			
9	1312.951 329	90	−100	−59	–			
10	1311.687 574	93	156	208	–			
11	1310.424 679	92	−131	−68	–			
12	–				–			
13	–				–			
14	1306.645 137	92	−84	6	–			
15	1305.388 399*		370	465	–			
16	1304.131 998	100	−127	−29	–			
17	–				–			
18	1301.623 885	111	−169	−75	–			
19	1300.371 842	128	29	117	–			
20	–			−1321	–			
21	–				–			
22	1296.621 653	141	−100	−47	–			
23	1295.373 871	167	75	113	–			
24	1294.126 698	165	−82	−61	–			
25	1292.881 025*		374	378	–			
26	1291.635 521*		175	164	–			
27	1290.390 968*		164	140	–			

Tabelle B.6 $H^{13}CP$ $(100)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				3205.909 312	1284	−351	−354
1	–				3207.174 983	642	−24	−28
2	–				3208.434 566	320	−18	−23
3	–				3209.688 155	256	−221	−228
4	3199.496 899	256	−60	−57	3210.936 582	212	211	204
5	3198.197 222	214	−111	−106	3212.178 504	182	−48	−56
6	3196.892 121	182	73	79	3213.414 870	182	−35	−44
7	3195.581 066	182	−55	−48	3214.645 284	160	−130	−140
8	3194.264 526	160	−42	−35	3215.870 057	160	−9	−19
9	3192.942 393	160	−13	−6	–			
10	3191.614 779	128	127	135	–			
11	3190.281 252	142	−70	−62	3219.509 083	142	351	341
12	–				–			
13	–				3221.904 885	142	−74	−83
14	3186.248 038	142	−8	0	3223.094 131	142	−35	−42
15	3184.892 590	142	8	15	3224.277 370	142	−46	−52
16	3183.531 641	142	13	19	3225.454 713	160	17	13
17	3182.165 150	142	−50	−46	3226.625 989	160	−4	−6
18	3180.793 327	160	9	12	–			−1208
19	3179.416 062	160	65	66	3228.950 541	182	−42	−37
20	3178.033 195	184	−62	−63	3230.103 884	212	35	43
21	3176.645 101	184	−14	−18	–			−1998
22	3175.251 600	216	11	4	–			
23	–			−2530	3233.527 376	256	−5	18
24	3172.448 374	216	−84	−98	–			
25	3171.038 896	324	6	−12	–			
26	3169.624 027	324	15	−8	3236.896 040	320	−204	−161
27	3168.203 218*		−624	−652	3238.006 990	428	−2	50
28	3166.778 667	434	267	234	3239.111 635	428	19	80
29	3165.347 659	434	−44	−83	3240.210 163	644	59	129
30	3163.911 893	434	121	75	3241.302 408	644	−37	43
31	3162.470 969	652	344	291	–			
32	3161.024 406	654	124	64	–			
33	3159.572 529	654	−233	−301	–			
34	3158.116 300	1314	216	139	–			

Anhang J

Linienlisten von $D^{12}CP$, $D^{13}CP$

A Tabellen zu DCP

Tabelle A.1 $D^{12}CP$ $(010)^{1e,f} \leftarrow (000)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				–				525.786 235	133	7	15
1	–				–				526.920 632	164	−47	−39
2	522.387 021	127	−1	8	524.663 491	1521	−32	39	528.055 826	2947	24	32
3	521.255 371	164	−3	7	–				529.191 583	3048	−2	6
4	520.124 427	254	−28	−18	524.688 955*		−376	−307	530.328 020	254	5	12
5	518.994 255	270	−21	−10	524.708 036	1124	274	341	531.465 006	3116	−76	−68
6	517.864 841	3148	−7	4	524.729 641	832	−236	−170	532.602 764	3058	−9	−1
7	516.736 173	530	−9	3	524.755 680	1012	7	71	533.741 071	3005	−4	5
8	515.608 289	3143	0	13	524.785 054	774	−94	−32	534.879 979	2973	3	12
9	514.481 164	3085	−14	−1	524.818 652*		352	412	536.019 516	2957	52	62
10	513.354 902	3069	41	55	524.855 297	1028	170	228	537.159 536	2941	11	21
11	512.229 347	3143	−1	14	524.895 461	721	−164	−109	538.300 131	2915	−17	−6
12	511.104 680	260	31	46	524.939 796	604	4	57	539.441 250	2899	−68	−57
13	509.980 733	329	−42	−26	524.987 532	610	−91	−42	540.583 036	2889	12	24
14	508.857 715	3588	−19	−3	525.039 256	742	140	187	–			
15	507.735 501	3615	−36	−20	525.094 316	652	51	94	542.867 942	2873	−45	−32
16	506.614 150	3577	−44	−27	525.153 129	625	61	101	544.011 205	2841	−13	0
17	505.493 773	3503	58	76	525.215 682	694	164	201	545.154 927	2809	−4	10
18	504.374 050	3429	−58	−40	525.281 688	1558	76	109	546.299 119	2777	7	22
19	503.255 393	3366	10	28	525.351 383	710	39	69	547.443 730	2761	−17	−1
20	502.137 560	3339	11	28	525.424 660	901	−49	−22	548.588 811	2756	−11	6
21	501.020 564	3339	−51	−35	525.501 744	821	44	67	549.734 285	2751	−39	−21
22	499.904 588	3360	−3	13	525.582 306	1007	−7	14	550.880 191	2740	−46	−28
23	498.789 430	3387	−55	−40	525.666 216	991	−324	−307	552.026 488	2724	−61	−42
24	497.675 279	376	−27	−12	525.754 560	1230	185	199	553.173 192	2708	−52	−32
25	496.562 030	3440	−33	−19	525.845 781	1548	−30	−19	554.320 274	2692	−34	−14
26	495.449 716	323	−47	−34	–				555.467 697	233	−29	−9
27	494.338 415	239	−1	10	526.039 352	832	−105	−101	556.615 446	509	−38	−17
28	493.228 011	281	−18	−8	526.152 623*		10970	10972	557.763 536	249	−30	−10
29	492.118 594	212	−17	−9	526.262 978*		15559	15558	558.911 926	159	−33	−12
30	491.010 144	185	−25	−20	526.356 566	233	−182	−185	560.060 617	207	−29	−8
31	489.902 709	185	−3	0	526.469 614	297	−18	−23	561.209 596	133	−16	4
32	488.796 241	180	−7	−6	526.586 063	201	3	−4	562.358 811	122	−32	−12
33	487.690 780	170	−3	−5	526.706 044	191	19	10	563.508 286	117	−37	−17
34	486.586 352	164	26	22	–				564.658 024	111	−11	8
35	485.482 905	164	22	14	526.956 519	175	−8	−19	565.807 970	106	5	23
36	484.380 492	159	29	18	527.087 027	154	−17	−29	566.958 100	101	3	20
37	483.279 111	159	39	25	527.221 053	133	−5	−18	568.108 387	101	−27	−11
38	482.178 757	159	40	23	527.358 571	122	11	−2	569.258 857	101	−45	−30
39	481.079 424	164	18	−2	527.499 620	122	82	68	570.409 536	101	−6	7
40	479.981 123	164	−22	−45	527.643 978	117	−3	−17	571.560 346	106	25	38
41	478.883 895	175	−45	−71	527.791 933	122	54	40	572.711 221	111	1	12
42	477.787 870	185	71	42	527.943 262	122	42	29	573.862 201	117	−23	−13
43	476.692 754	212	26	−6	528.098 043	122	51	39	575.013 324	127	8	16
44	475.598 750	154	17	−17	528.256 199	127	15	4	576.164 461	101	−18	−11
45	474.505 857	148	37	1	528.417 715	143	−67	−77	577.315 689	95	−8	−3
46	473.414 030	143	34	−4	528.582 776	164	0	−9	578.466 944	90	−8	−4
47	472.323 308	148	42	3	528.751 107	201	−45	−52	579.618 212	85	−16	−13
48	471.233 672	154	35	−5	528.922 890	244	−6	−12	580.769 518	80	11	12
49	470.145 161	170	47	7	529.097 916	291	−81	−85	581.920 760	85	−13	−12
50	469.057 761	196	59	19	529.276 553	297	112	110	583.072 001	90	−6	−6
51	467.971 473	239	64	27	529.458 092	398	−121	−122	584.223 190	95	−3	−3

... *Fortsetzung auf der nächsten Seite*

Tabelle A.1 Fortsetzung von $D^{12}CP$ $(010)^{1e,f} \leftarrow (000)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
52	466.886283	265	45	10	529.643307	122	6	7	585.374327	111	14	15
53	465.802231	302	36	5	529.831686	143	−3	−1	586.525359	133	10	11
54	464.719291	345	5	−21	530.023388	170	24	27	587.676261	154	−23	−20
55	463.637548	398	32	13	530.218280	217	−31	−28	588.827123	180	24	29
56	462.556988	403	99	89	530.416481	286	−35	−31	589.977762	228	−15	−6
57	461.477337	456	−73	−74	530.617939	254	−23	−20	591.128115	270	−185	−172
58	460.399072	461	−13	−1	530.822640	302	4	7	592.278715	360	66	84
59	459.321828	435	−90	−64	531.030519	366	−2	−1	593.428910	413	104	128
60	458.245505*		−409	−365	531.241629	387	27	26	594.578700	541	−53	−21
61	–				–				–			
62	–				531.673147	1288	−139	−149	596.877979	726	36	89
63	–				531.893921	721	63	47	598.027088	1044	−60	5
64	–				532.117154*		−406	−429	599.175976	731	−93	−13
65	–				532.344455	514	79	46	–			
66	–				532.574201	2242	−88	−132	–			
67	–				532.805961*		−1321	−1378	–			

Tabelle A.2 $D^{12}CP$ $(020)^{0e} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				515.128094	567	−45	−17
2	–				512.851467	180	−172	−192	516.273110	297	−24	3
3	–				512.854004	159	79	60	517.421801	212	−27	−2
4	508.336951	191	27	43	512.856882	159	−70	−89	518.574220	180	29	51
5	507.218294	191	26	37	512.860753	154	48	30	519.730196	164	7	24
6	506.103397	175	12	17	512.865160	148	0	−18	520.889781	154	−3	9
7	504.992260	164	−4	−5	–				522.052950	143	16	23
8	503.884923	159	32	25	512.876107	154	32	17	523.219597	127	5	8
9	502.781286	148	39	27	512.882463	159	−7	−20	524.389724	122	19	16
10	501.681285	143	−21	−38	512.889446	154	7	−4	525.563225	117	7	−1
11	500.585071	138	30	9	512.896940	154	−2	−9	526.740073	117	1	−10
12	499.492453	133	34	10	512.904918	159	−11	−16	527.920191	122	−9	−23
13	498.403405	133	2	−24	512.913340	154	−12	−13	529.103540	127	5	−11
14	497.317928	127	−23	−50	512.922142	154	−11	−10	530.289988	127	−15	−32
15	496.236021	127	3	−23	512.931284	154	9	13	531.479536	127	10	−8
16	495.157527	127	−26	−50	512.940661	154	8	15	532.672052	122	29	11
17	494.082486	133	−16	−37	512.950208	154	−12	−4	533.867407	117	−2	−17
18	493.010800	133	−7	−23	512.959938	148	33	41	535.065612	117	19	6
19	491.942410	148	5	−5	512.969642	148	10	16	536.266499	111	16	7
20	490.877223	154	−6	−10	512.979307	148	−16	−13	537.469975	111	−5	−9
21	489.815222	164	13	15	512.988867	148	−28	−30	538.675975	111	−8	−8
22	488.756306	175	35	44	512.998284	148	22	15	539.884395	117	7	12
23	487.700399	180	62	78	513.007373	148	40	25	541.095077	111	−9	0
24	486.647362	180	38	60	513.016031	148	13	−8	542.307956	122	−11	2
25	485.597137	180	−12	15	513.024192	154	−27	−52	543.522902	122	−13	2
26	484.549679	170	−43	−13	513.031856	154	18	−8	544.739770	127	−45	−27
27	483.504999	175	47	77	513.038800	154	27	6	545.958561	138	16	35
28	482.462785	175	38	67	513.044921	164	0	−4	547.178960	148	−25	−6
29	481.423003	159	−5	20	513.050192	175	16	44	548.401020	164	11	28
30	480.385660	159	23	41	513.054494	191	64	147	549.624532	175	39	54
31	479.350534	159	1	9	513.057254	170	−320	−151	550.849300	122	−9	3
32	478.317619	164	26	22	513.059608	154	111		552.075310	117	−19	−9
33	477.286723	170	9	−8	–				553.302405	106	−18	−12
34	476.257810	170	21	−10	–				554.530429	101	−34	−29
35	475.230740	164	26	−19	–				555.759316	95	−2	1
36	474.205397	154	16	−43	–				556.988857	95	−3	1
37	473.181708	148	24	−46	–				558.218961	101	0	8
38	472.159588	154	70	−7	–				559.449483	101	−10	4
39	471.138789	164	12	−66	–				560.680318	111	−12	8
40	470.119357	175	1	−72	–				561.911337	117	−12	15
41	469.101220	223	66	5	–				563.142409	127	−19	13
42	468.084083	244	14	−26	–				564.373440	143	−9	23
43	467.068026	260	23	11	–				565.604263	159	−32	−13
44	466.052896	276	35	59	–				–			
45	465.038611	297	62	125	–				568.065045	217	27	−45
46	464.024985	318	7	108	–				569.294678	249	−2	−180
47	463.012158	350	97	228	–				570.523696	291	−44	−389
48	461.999690	408	−28	116	–				571.752099	281	−2	−601
49	460.987732	445	−137	−14	–				572.980659*		988	20
50	459.976729*		287	341	–				574.206251	408	−112	−1600
51	458.965255	503	−111	−202	–				575.431999	493	−94	−2300

... *Fortsetzung auf der nächsten Seite*

Tabelle A.2 Fortsetzung von $D^{12}CP$ $(020)^{0e} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
52	457.954717	514	139	−201	–				576.656937	668	153	−3019
53	456.944047	461	29	−702	–				577.880436	737	73	−4380
54	–				–				579.102875	800	115	−6011
55	–				–				580.323915	1012	1	−8278

Tabelle A.3 $D^{12}CP$ $(020)^{2e,f} \leftarrow (010)^{1e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				–				529.425514	117	−4	−7
3	522.612112	588	−92	−95	526.006290	138	−18	−35	530.573630	111	−5	−6
4	521.489237	286	−70	−70	526.008801	127	42	28	531.725355	111	16	18
5	520.370103	217	29	32	526.011822	127	−31	−42	532.880612	111	−26	−21
6	519.254565	180	32	40	526.015654	127	45	38	534.039556	106	13	22
7	518.142689	170	−24	−12	526.020009	127	−43	−46	535.202058	106	−11	1
8	517.034658	164	8	24	–				536.368195	106	−41	−26
9	515.930185	133	−197	−176	526.031100	127	−14	−8	537.538073	106	8	25
10	514.829949	143	−1	24	–				538.711548	106	−37	−17
11	513.733401	138	−1	28	526.045316	133	8	21	539.888802	101	−22	−1
12	512.640737	138	−48	−17	526.053699	127	18	33	541.069796	101	−20	1
13	511.552140	154	−15	19	526.062959	133	−9	9	542.254584	101	−17	3
14	510.467559	159	−8	27	526.073212	133	−7	13	543.443229	106	11	29
15	509.387078	170	−6	29	526.084446	133	−44	−24	544.635732	106	19	34
16	508.310742	175	−26	7	526.096857	127	17	38	545.832120	106	−15	−4
17	507.238670	185	−20	12	526.110328	127	−4	17	547.032536	106	0	7
18	506.170940	175	21	50	526.125028	127	−3	17	548.237032	106	62	63
19	505.107539	170	8	32	526.141624*		616	634	549.445491	111	−6	−11
20	504.048591	159	−15	5	526.158299	122	−38	−22	550.658187	111	9	−2
21	502.994233	159	10	23	526.177080	122	−14	1	551.875068	117	−12	−28
22	501.944473	159	3	11	526.197390	122	32	44	553.096291	122	23	1
23	500.899420	170	−14	−11	526.219192	117	−22	−12	–			
24	499.859220	196	15	12	526.242706	117	−41	−33	555.551803	122	8	−21
25	498.823898	212	20	12	526.268013	117	−34	−26	556.786314	122	33	1
26	497.793467	154	−82	−95	526.295163	117	−40	−34	558.025298	133	−55	−87
27	496.768320	164	2	−13	526.324315	117	4	11	559.269042	138	−48	−78
28	495.748286	159	1	−15	–				560.517585	148	10	−16
29	494.733575	148	22	6	526.388725	122	−41	−32	561.770890	106	1	−21
30	493.724240	138	14	−1	526.424285	133	−25	−15	563.029111	106	−7	−22
31	492.720430	127	18	5	526.462212	138	13	24	564.292342	101	−4	−12
32	491.722243	127	25	16	526.502519	143	−15	−3	565.560647	101	−13	−12
33	490.729772	133	21	16	526.545455	154	38	49	566.834262	101	118	127
34	489.743134	154	14	13	526.590994	164	42	52	568.112860	101	−24	−8
35	488.762427	170	−7	−5	526.639240	180	0	6	569.396950	101	−15	6
36	487.787808	180	6	10	526.690428	191	44	44	570.686442	101	−29	−5
37	486.819322	175	−9	−6	526.744481	223	−4	−12	571.981479	106	−5	17
38	485.857114	180	−15	−16	526.801724	249	82	63	573.282074	117	−13	6
39	484.901314	212	14	4	526.861963	281	8	−24	574.588346	133	−10	1
40	483.952073	260	123	100	526.925575	291	55	11	575.900385	143	15	17
41	483.009215	291	35	−6	–				577.218191	164	−9	−18
42	482.073091	350	1	−60	527.062858	413	79	21	578.541909	185	−8	−26
43	481.143677	366	−98	−183	527.136646	138	−7	−56	579.871538	207	−51	−69
44	480.221377	382	48	−59	527.214135	143	−3	−23	581.207209	233	−68	−72
45	479.305892	509	49	−73	527.295351	175	36	76	582.549014	302	−27	9
46	478.397337	578	−64	−188	527.380307	185	46	192	583.896874	345	−61	54
47	477.496231	578	146	43	–				585.250881	445	−126	123
48	476.602285*		312	267	–				586.611310	530	6	470
49	475.715218	726	81	149	–				587.977767	572	−97	689
50	474.835567	769	−78	181	–				589.350646	816	−76	1177
51	–				–				590.729894	880	−12	1895
52	–				–				592.115616	1177	174	2978

Tabelle A.4 $D^{12}CP$ $(020)^{2e,f} \leftarrow (010)^{1f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				–				529.416 595	111	75	64
3	522.594 299	631	52	38	526.024 862*		621	642	530.555 634	111	14	4
4	521.459 353	276	−12	−27	526.039 444*		825	845	531.695 262	117	−12	−21
5	520.325 100	196	−33	−48	526.056 576	127	−13	5	532.835 478	117	7	−1
6	519.191 606	164	45	30	526.078 129	122	−22	−5	533.976 192	111	−6	−13
7	518.058 648	154	−12	−27	526.103 305	122	3	18	535.117 455	111	12	7
8	516.926 396	148	−47	−61	526.131 999	127	−41	−29	536.259 227	106	35	31
9	515.794 942	143	24	10	526.164 341	122	−23	−13	537.401 405	106	−29	−32
10	514.664 129	138	30	17	526.200 241	122	−30	−23	538.544 159	106	3	2
11	513.534 009	133	15	3	526.239 790	122	33	37	539.687 397	101	53	53
12	512.404 582	133	−33	−45	526.282 844	122	23	24	540.830 974	101	−11	−10
13	511.275 953	138	−20	−30	526.329 442	117	−17	−19	541.975 088	101	21	23
14	510.148 044	148	−33	−43	526.379 662	117	−5	−10	543.119 594	101	17	21
15	509.020 977	154	38	30	526.433 466	122	25	17	544.264 492	101	−8	−3
16	507.894 578	154	10	4	526.490 788	117	10	−1	545.409 783	101	−40	−34
17	506.768 957	164	−17	−22	526.551 694	117	22	8	546.555 545	101	12	20
18	505.644 147	164	−21	−24	526.616 117	117	−3	−20	547.701 581	101	−35	−26
19	504.520 154	154	−5	−6	526.684 137	117	21	1	548.848 036	101	−23	−13
20	503.396 894	159	−62	−63	526.755 676	117	20	−2	549.994 857	101	11	22
21	502.274 529	170	−42	−41	526.829 829*		−904	−929	551.141 939	101	−27	−15
22	501.153 001	180	−11	−8	526.909 371	117	29	2	552.289 362	106	−40	−27
23	500.032 317	180	29	34	526.991 555	117	78	48	553.437 151	106	10	23
24	498.912 418	191	9	15	527.077 166	117	34	3	554.585 136	111	−34	−19
25	497.793 467	154	83	90	527.166 281	117	−19	−52	555.733 421	111	−51	−36
26	496.675 209	223	−14	−5	527.259 032	117	57	24	556.882 034	117	0	16
27	495.557 925	164	−8	2	527.355 158	122	9	−25	558.030 895	127	53	70
28	494.441 551	164	26	37	527.454 827	127	12	−22	559.179 861	138	−18	−1
29	493.326 026	164	19	31	527.558 080	122	115	81	560.329 114	148	−18	−1
30	492.211 404	159	18	29	527.664 616	143	24	−10	561.478 629	148	43	61
31	491.097 638	159	−35	−24	527.774 683	148	−5	−37	562.628 197	106	−27	−10
32	489.984 860	159	−15	−4	527.888 241	159	−2	−33	563.778 013	101	−20	−3
33	488.872 997	159	−4	6	528.005 292	170	42	13	564.927 959	101	−38	−21
34	487.762 063	159	4	12	528.125 690	191	−10	−36	566.078 076	95	−25	−7
35	486.652 070	159	13	19	528.249 659	185	76	53	567.228 297	95	−31	−14
36	485.543 006	164	4	7	528.376 911	228	22	1	568.378 649	95	−14	2
37	484.434 891	170	−12	−14	528.507 615	111	5	−12	569.529 080	101	−12	4
38	483.327 782	175	14	8	528.641 707	111	−28	−42	570.679 576	106	−21	−6
39	482.221 621	191	17	5	528.779 264	122	9	0	571.830 137	111	−25	−11
40	481.116 415	207	−3	−22	528.920 170	127	12	7	–			
41	480.012 256	233	37	10	529.064 514	133	81	80	574.131 378	127	−34	−22
42	478.909 038	239	26	−11	529.212 050	138	−21	−18	575.282 057	138	−6	4
43	477.806 833	281	26	−22	529.363 222	133	163	170	576.432 683	164	−27	−18
44	476.705 688	307	80	19	529.517 389	159	2	13	577.583 336	185	−1	7
45	475.605 420	382	−4	−79	529.675 008	180	−34	−19	578.734 015	175	88	94
46	–				529.836 002	212	−10	7	579.884 485	239	23	27
47	473.408 066	535	−61	−170	530.000 252	254	−34	−15	581.034 916	270	−11	−9
48	472.311 126	525	100	−31	530.167 798	355	−53	−32	582.185 268	323	−36	−36
49	471.214 996	583	29	−124	530.338 522	286	−171	−150	583.335 568	445	−9	−11
50	–				530.512 737	567	−64	−44	584.485 737	498	10	5
51	–				530.690 131	435	−30	−13	585.635 723	668	−16	−23
52	–				530.870 716	477	−43	−30	586.785 695	641	101	91
53	–				531.054 623	578	41	47	587.935 197	800	−78	−91
54	–				531.241 629	387	14	11	589.085 079	1044	314	298
55	–				–				590.234 097	1251	52	32
56	–				–				591.383 115	986	16	−7
57	–				–				592.534 121*		2214	2187

Tabelle A.5 $D^{12}CP$ $(030)^{1e,f} \leftarrow (020)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				503.826 077*		443	463
2	499.277 544	244	28	41	–				504.961 585*		602	621
3	498.138 884	239	24	34	501.548 920	254	−27	−16	506.095 576	477	−43	−25
4	496.999 498	228	−55	−50	501.546 304	228	−3	6	507.229 509	424	−2	15
5	495.859 608	212	21	21	501.542 976	201	−20	−12	508.362 964*		343	357
6	494.718 908	207	−39	−43	501.538 948	191	−55	−49	509.494 836	376	−72	−60
7	493.577 665	207	54	46	501.534 351	191	31	35	510.626 264	376	−60	−51
8	492.435 591	196	39	27	501.528 930	175	−4	−2	511.756 828	403	13	20
9	491.292 759	201	21	6	501.522 816	175	−16	−17	–			
10	490.149 110	201	−21	−37	501.516 067	170	66	63	514.014 714	366	−64	−60
11	489.004 695	212	8	−9	501.508 397	170	−25	−30	515.142 166	297	50	54
12	487.859 378	228	22	5	501.500 105	170	25	19	516.268 298	254	41	46
13	486.713 048	228	−37	−51	501.490 983	170	30	22	517.393 095	239	−26	−19
14	485.565 789	239	−22	−33	501.481 044	164	22	14	518.516 545	244	−76	−66
15	484.417 484	249	14	7	501.470 280	170	17	7	519.638 674	276	10	23
16	483.268 021	249	30	28	501.458 628	170	−27	−36	520.759 168	302	15	32
17	482.117 302	260	5	8	501.446 184	170	13	4	521.878 028	270	42	63
18	480.965 316	276	9	18	501.432 726	175	−59	−67	522.995 070	260	15	40
19	479.811 923	286	−12	2	501.418 477	175	7	−1	524.110 176	244	−72	−43
20	478.657 111	276	21	40	501.403 228	180	31	24	–			
21	477.500 651	302	−24	−3	501.386 972	185	35	30	526.334 490	201	−41	−10
22	476.342 609	334	18	39	501.369 669	191	10	6	527.443 266	281	−107	−78
23	475.182 749	366	17	35	501.351 314	196	−15	−18	528.549 806	329	−38	−14
24	474.020 954	382	−37	−24	501.331 906	207	−11	−13	529.653 861	313	52	69
25	472.857 223	350	−32	−26	501.311 419	207	32	29	530.755 104	334	−27	−19
26	471.691 288	424	−119	−123	501.289 748	228	43	39	531.853 731	371	64	59
27	470.523 352	477	24	9	501.266 822	239	−14	−20	532.949 299	435	25	7
28	469.353 023	546	128	101	501.242 699	254	−45	−53	–			
29	468.179 921	599	−63	−99	501.217 418	276	28	14	535.131 134	604	29	−12
30	467.004 491	509	25	−14	501.190 804	313	65	45	536.217 011	806	−16	−62
31	465.826 014	588	−199	−231	501.162 699	323	−52	−80	537.299 434	1261	19	−21
32	464.645 203	604	110	100	501.133 391	360	2	−36	–			
33	463.461 129	578	156	192	501.102 644	403	30	−19	–			
34	462.273 588	578	−133	−20	501.070 595	466	209	147	–			
35	–				501.036 755	339	90	12	–			
36	–				501.001 490	413	77	−16	–			
37	–				500.964 360	509	−229	−337	–			
38	–				500.926 224	493	71	−52	–			
39	–				500.886 499*		432	297	–			
40	–				500.844 570	472	281	136	–			
41	–				500.800 110*		−670	−819	–			
42	–				–				–			
43	–				500.709 046*		633	501	–			
44	–				500.659 467	456	−9	−114	–			
45	–				500.607 539*		−1114	−1175	–			
46	–				500.555 324*		−582	−575	–			
47	–				500.501 147	530	−49	52	–			
48	–				500.443 878*		−609	−380	–			

Tabelle A.6 $D^{12}CP$ $(030)^{1e,f} \leftarrow (020)^{2e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				–				515.842 966	207	39	30
1	–				–				516.978 814	180	14	5
2	512.430 320	254	−41	−45	514.721 883	133	6	−14	518.113 838	143	10	1
3	511.291 229	207	−14	−16	514.737 538	122	−2	−20	–			
4	510.151 300	164	−60	−59	514.758 463	117	29	14	520.381 285	117	−32	−41
5	509.010 744	175	8	11	514.784 580	117	13	1	521.513 785	117	16	8
6	507.869 429	164	33	39	514.815 955	122	6	−2	522.645 370	122	13	7
7	506.727 375	159	5	14	514.852 587	122	−6	−11	523.776 078	127	−5	−10
8	505.584 673	148	−14	−3	514.894 503	127	−11	−12	524.905 937	133	−13	−17
9	504.441 357	143	−25	−13	514.941 742	133	15	17	526.037 901*		2936	2933
10	503.297 479	138	−13	2	514.994 251	138	−1	5	527.166 268*		3129	3128
11	502.153 065	133	12	27	515.052 109	143	1	9	528.290 464	111	−18	−19
12	501.008 120	133	12	27	515.115 330	148	11	22	529.416 582*		−427	−428
13	499.862 699	133	−2	13	515.183 912	154	5	17	530.542 739	111	2	1
14	498.716 891	133	14	28	515.257 896	159	−2	9	531.667 745	117	58	57
15	497.570 679	133	−7	5	515.337 307	159	−14	−3	532.791 889	117	9	7
16	496.424 165	133	−13	−5	515.422 185	148	−19	−10	533.915 352	117	11	8
17	495.277 403	127	−6	−1	515.512 609	143	31	38	535.038 096	111	−2	−7
18	494.130 451	127	17	18	515.609 205*		729	734	536.160 172	111	−10	−16
19	492.983 329	133	18	14	515.709 921	133	−8	−7	537.281 622	111	−2	−10
20	491.836 109	133	5	−3	515.816 979	122	6	3	538.402 482	111	21	12
21	490.688 890	133	16	3	515.930 198	307	555	548	539.522 820	111	91	81
22	489.541 676	138	−11	−29	516.047 981	122	5	−5	540.642 477	117	7	−3
23	488.394 659	143	46	24	516.172 015	127	7	−6	541.761 729	117	4	−5
24	487.247 740	148	19	−6	516.301 778	133	1	−14	542.880 392	117	−147	−155
25	486.101 102	154	20	−9	516.437 308	133	−12	−28	543.998 964	117	5	1
26	484.954 791	164	19	−11	516.578 671	127	−4	−19	545.117 052	127	19	18
27	483.808 892	175	26	−5	516.725 919	127	41	27	546.234 800	127	−12	−7
28	482.663 484	185	44	13	516.878 961	133	−5	−16	547.352 326	138	−22	−11
29	481.518 586	201	12	−17	517.037 954	133	−21	−27	548.469 668	148	−27	−8
30	480.374 361	212	15	−13	517.202 950	143	11	11	549.586 893	159	−13	12
31	479.230 862	228	24	−2	517.373 896	154	7	12	550.704 026	170	−14	20
32	478.088 088	249	−42	−66	517.550 884	159	27	39	551.821 120	175	−30	10
33	476.946 309	276	5	−17	517.733 862	170	−9	10	552.938 280	185	−16	29
34	475.805 458	291	17	−4	517.922 948	196	−7	17	554.055 505	201	−29	19
35	474.665 634	323	11	−11	518.118 128	212	−4	25	555.172 965	217	44	91
36	473.526 968	360	38	13	518.319 403	233	−16	14	556.290 464	239	−51	−8
37	472.389 491	382	49	18	–				557.408 304	254	−67	−34
38	471.253 283	424	45	6	–				558.526 509	297	−35	−19
39	470.119 357*		961	913	518.960 003	313	−60	−39	559.645 107	329	17	12
40	468.985 098	535	107	48	519.185 773	313	−113	−98	560.764 202	398	143	110
41	467.853 141	625	44	−23	–				561.883 572	450	69	5
42	466.722 870	572	85	15	519.655 898	583	−12	−3	563.003 452	530	−17	−114
43	465.594 117	620	−6	−68	519.899 991	562	−87	−70	564.123 985	753	−17	−145
44	464.467 430	753	253	216	–				565.245 212	641	66	−84
45	463.341 946	668	−63	−46	520.406 578	456	−14	85	566.367 341*		401	247
46	462.218 470	652	−208	−96	–				567.489 366	880	−55	−183
47	–				–				568.612 816*		196	138
48	–				–				569.736 449	1034	−118	−39
49	–				–				570.860 998	1553	−288	17

Tabelle A.7 $D^{12}CP$ $(030)^{1e,f} \leftarrow (020)^{2f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	499.283599	244	40	33	501.569080	323	48	56	–			
3	498.156958	233	−38	−44	501.585101	249	−56	−46	–			
4	497.035816	217	−29	−34	501.606706	239	79	89	507.320344	387	206	201
5	495.920102	207	−10	−14	501.633393	207	−25	−14	508.489620	355	72	68
6	494.809841	191	41	38	501.665493	185	−7	6	509.664115	302	−112	−114
7	493.704897	185	−14	−16	501.702910	175	76	89	510.844096	265	−50	−51
8	492.605465	185	21	21	501.745356	164	−23	−7	512.029249	249	−30	−29
9	491.511382	185	−15	−12	501.793085	154	2	19	513.219594	228	1	4
10	490.422799	185	36	40	501.845875	148	−17	2	514.415171	207	115	119
11	489.339467	180	−69	−63	501.903557	138	−185	−165	515.615574	154	−59	−52
12	488.261719	185	13	21	501.966555	143	−12	10	516.821273	254	−12	−4
13	487.189248	201	−15	−5	502.034281	154	−9	14	518.031995	239	21	31
14	486.122224	207	33	45	502.106813	159	−19	5	519.247908	117	251	263
15	485.060477	228	2	15	502.184139	164	33	59	520.468281	196	−8	5
16	484.004112	233	16	30	502.265937	164	−80	−54	521.693794	212	−30	−15
17	482.953089	249	55	70	502.352462	164	−5	22	522.924212	223	0	16
18	481.907213	265	−52	−36	502.443324	159	−25	1	524.159442	207	40	57
19	480.866764	265	0	16	502.538547	164	−6	19	525.399328	175	−11	7
20	479.831449	270	−53	−38	502.637961	175	2	25	526.643922	196	−45	−27
21	478.801430	265	−19	−5	502.741450	180	5	25	527.893211	239	−15	3
22	477.776570	270	−3	10	502.848835	175	−44	−28	529.147091	270	37	55
23	476.756818	297	−18	−8	502.960105	170	−23	−10	530.405299	360	−87	−70
24	475.742186	334	−14	−8	503.075063	175	15	23	531.667745*		−410	−394
25	474.732602	329	−23	−21	503.193526	185	33	36	532.935253	307	−37	−23
26	473.728092	376	25	22	503.315311	212	2	−1	534.206657	286	−61	−50
27	472.728473	419	−5	−15	503.440327	217	−13	−21	535.482391	323	28	36
28	471.733720	382	−90	−107	503.568454	212	32	20	536.762165	323	20	24
29	470.743969	366	−40	−66	503.699427	239	42	25	538.045942	329	−41	−40
30	469.759155	398	135	100	503.833028	265	−31	−51	539.333838	488	48	44
31	468.778834	472	50	3	503.969238	281	−26	−47	540.625501	551	22	15
32	467.803227	503	−12	−71	504.107803	260	−17	−37	541.920944	445	−12	−24
33	466.832381	519	60	−13	504.248492	276	−48	−64	543.220140	424	12	−4
34	465.866197	557	237	149	504.391300	339	65	55	544.522919	594	24	5
35	464.904225	615	139	36	504.535704	408	−7	−8	–			
36	463.946476	551	−148	−267	504.681782	334	9	19	–			
37	462.993142*		−352	−487	504.829109	382	−112	−89	–			
38	462.044705	657	91	−60	504.977953	429	98	134	–			
39	–				505.127503	440	34	79	–			
40	–				505.278047	456	188	236	–			
41	–				505.428551	450	−267	−228	–			
42	–				505.580273	572	135	147	–			
43	–				505.731523	488	−87	−132	–			
44	–				505.883394	450	371	226	–			
45	–				506.034023	620	−146	−449	–			

Tabelle A.8 $D^{12}CP$ $(030)^{3e,f} \leftarrow (020)^{2e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				529.710189*		1061	1008
2	–				–				530.852446	111	−7	−55
3	–				527.440415	127	−1	89	531.997736	117	0	−45
4	–				527.448393	111	−32	55	533.145002	117	42	1
5	521.761788	228	83	13	527.458358	117	−87	−5	534.294177	117	74	37
6	520.634532	175	135	65	527.470286	122	−199	−123	535.445288	117	146	114
7	519.509317	164	224	155	527.484306	127	−247	−176	536.598334	117	286	257
8	518.386220*		434	368	527.499633*		−1025	−961	537.753224*		431	406
9	517.265085*		623	561	527.518244*		−566	−509	538.910115*		771	749
10	516.145126	170	17	−40	527.539012	117	−11	39	540.067726	106	61	42
11	515.027745	170	36	−14	527.561337	122	28	70	541.227769	106	49	33
12	513.912233	175	−10	−53	527.585662	117	−22	14	542.389460	106	−6	−19
13	512.798749	175	60	27	527.612159	117	−3	26	543.552838	106	−22	−33
14	511.687030	185	10	−14	–				544.717838	106	−18	−26
15	510.577168	180	−41	−56	527.671508	122	9	25	545.884381	106	−23	−28
16	509.469209	185	−18	−22	527.704374	122	−21	−11	547.052467	106	15	12
17	508.362964	180	−74	−67	527.739463	122	−7	−2	548.221940	106	−5	−5
18	507.258568	185	−38	−22	–				549.392824	106	−1	2
19	506.155887	180	−7	17	527.816258	122	18	15	550.565030	106	−1	4
20	505.054833	180	−27	6	527.857965	122	−16	−21	551.738492	106	−9	0
21	503.955447	175	−12	27	527.901986	122	−5	−12	552.913130	111	−37	−26
22	502.857624	170	−20	21	–				554.088946	111	−15	−3
23	501.761364	170	−4	39	527.996935	117	18	11	555.265781	117	−31	−17
24	500.666575	170	−4	38	528.047901	117	16	9	556.443624	117	−23	−8
25	499.573257	170	34	72	–				557.622369	127	−21	−4
26	498.481267	180	23	53	528.156934	122	−30	−34	558.801938	127	−24	−6
27	497.390636	196	50	70	528.215564*		433	431	559.982265	143	−18	0
28	496.301157	201	−33	−24	–				561.163286	154	14	32
29	495.212979	212	−14	−20	528.338840	133	−20	−18	562.344843	159	−2	17
30	494.125939	228	3	−16	528.404480	138	1	3	563.526884	170	−33	−13
31	493.039919	265	−35	−67	528.472631	148	−10	−8	564.709382	191	−19	2
32	491.954984	286	1	−43	528.543384	159	8	10	565.892195	212	−15	8
33	490.871031	291	72	21	528.616740	175	29	28	567.075203	233	−54	−28
34	489.787901	355	83	33	528.692660	196	−17	−22	568.258434	254	−18	11
35	488.705432	424	−61	−101	528.771247	223	−57	−68	569.441678	291	−30	3
36	487.623839	466	−83	−100	528.852764	260	144	124	570.624896	371	−39	−1
37	486.543128	498	89	110	528.936753	286	97	67	571.808022	350	−24	18
38	485.462732	557	−49	29	529.023488	350	49	6	572.990939	398	−14	31
39	–				529.113022	419	23	−35	574.173451	461	−120	−76
40	483.303639	604	−259	7	–				575.355884	503	69	105
41	–				529.300643	466	81	−12	576.537519	519	−82	−65
42	–				529.398730	456	110	−2	–			
43	–				529.499629	461	63	−67	–			

Tabelle A.9 $D^{12}CP\ (030)^{3e,f} \leftarrow (020)^{2f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				–				530.852 446	111	−11	50
3	–				527.440 415	127	19	−24	531.997 736	117	−21	40
4	522.890 993	387	−91	−40	527.448 393	111	30	−13	533.145 002	117	−20	40
5	521.761 788	228	−60	−12	527.458 358	117	56	14	534.294 177	117	−70	−12
6	520.634 532	175	−152	−107	527.470 286	122	87	47	535.445 288	117	−142	−85
7	519.509 317	164	−293	−252	527.484 306	127	268	230	536.598 334	117	−233	−178
8	518.386 220*		−428	−391	527.499 633	2878	−167	−203	537.753 224*		−435	−382
9	517.265 085*		−732	−699	527.518 244*		781	747	538.910 115*		−590	−540
10	516.147 140	164	−3	26	527.537 024	117	20	−12	540.069 661	106	−49	−2
11	515.030 596	170	−52	−28	527.558 067	673	−329	−358	541.230 659	106	−18	27
12	513.916 353	180	−7	13	527.581 621	117	11	−15	542.393 606	106	−4	37
13	512.804 372	180	66	81	527.606 627	117	12	−10	543.558 514	106	−5	33
14	511.694 510	185	−6	5	527.633 398	122	21	3	544.725 423	106	13	47
15	–				527.661 896	122	37	23	545.894 307	106	12	42
16	509.481 843	185	−6	−3	527.692 028	122	5	−5	–			
17	508.379 037	185	−3	−4	527.723 821	122	−7	−14	–			
18	507.278 546	175	−81	−85	527.757 236	122	3	−1	549.413 017	106	−25	−6
19	506.180 624	180	−24	−31	527.791 946	3037	−246	−247	550.590 036	106	−4	11
20	505.085 155	180	13	3	527.828 644	122	−15	−14	551.769 095	106	−15	−4
21	503.992 112	170	−38	−52	527.866 571	122	−17	−13	552.950 273	111	−1	7
22	502.901 770	159	55	39	527.905 910	122	−17	−13	554.133 556	117	2	7
23	501.813 912	159	29	11	527.946 701	122	73	77	555.318 971	117	−5	−4
24	500.728 690	164	−10	−30	527.988 643	122	5	8	556.506 583	122	15	14
25	499.646 227	170	12	−9	528.031 893	117	−12	−11	557.696 353	127	−5	−9
26	498.566 517	180	37	16	528.076 359	122	−18	−20	558.888 372	133	−7	−14
27	497.489 587	196	41	19	528.122 028	122	27	23	560.082 641	138	−24	−32
28	496.415 520	212	49	28	528.168 718	127	−6	−14	561.279 212	148	−40	−50
29	495.344 298	244	−13	−33	528.215 564*		−928	−940	562.478 150	154	−29	−40
30	494.276 123	270	−3	−21	528.265 236	133	−19	−34	563.679 468	170	−19	−31
31	493.210 976	281	−4	−20	528.314 985	143	23	6	564.883 232	185	11	0
32	492.148 935	313	−1	−14	528.365 585	154	22	3	566.089 389	191	−37	−47
33	491.090 190	318	127	118	–				567.298 188	212	35	28
34	490.034 570	355	140	134	528.469 283	185	23	6	568.509 419	244	−33	−37
35	488.982 103	403	−8	−8	528.522 289	201	20	8	569.723 332	281	−48	−47
36	487.933 238	387	57	63	528.576 015	223	17	11	570.939 964	307	−28	−22
37	486.887 734	429	16	29	528.630 420	270	9	9	572.159 396	376	45	58
38	–				528.685 441	318	−35	−29	573.381 574	398	55	76
39	484.807 380	482	−142	−112	528.741 219	334	52	62	574.606 577	450	14	43
40	483.772 823	588	−137	−98	528.797 391	392	−70	−64	575.834 522	498	−31	7
41	482.742 438	641	230	278	–				577.065 607	562	45	92
42	481.715 224	694	−136	−79	–				578.299 542	620	−124	−68
43	480.692 222	631	−289	−224	–				579.536 852	954	−92	−30
44	479.673 777	726	15	87	–				580.777 666	933	188	253
45	–				–				582.021 306	821	−49	14
46	–				–				583.268 868	1086	205	260
47	–				–				–			
48	–				–				585.773 855	1166	−88	−86
49	–				–				587.032 221	1193	112	62

Tabelle A.10 $D^{12}CP$ $(040)^{0e} \leftarrow (030)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	500.390911	387	92	90	–				508.384915	567	178	172
4	499.269991	382	−151	−162	–				–			
5	–				–				510.715837	578	27	4
6	497.044984	339	287	257	503.769389	334	131	95	511.888880	503	−10	−39
7	495.939844	339	−6	−42	503.763667	297	0	−39	513.066827	403	−47	−80
8	494.840176	307	−1	−44	503.757115	286	68	29	514.249535	387	−117	−153
9	493.745584	313	−27	−72	503.749307	276	0	−35	515.437186	429	83	47
10	492.656045	302	−24	−67	503.740251	270	−92	−187122	516.629310	376	213	181
11	491.571549	313	93	55	503.730023	265	−18	−39	517.825436	445	−52	−78
12	490.491689	313	21	−7	503.718214	244	−64	−73	519.026087	376	−36	−52
13	489.416596	313	8	−6	503.704985	260	68	73	520.230858	403	24	17
14	488.345969	345	−117	−115	503.689769	254	−44	−25	521.439513	366	67	70
15	487.280096	355	71	93	503.672793	249	−18	15	522.651765	503	−6	6
16	486.218192	371	−60	−20	503.653757	260	12	56	523.867613	684	2	18
17	485.160506	387	−102	−45	503.632414	260	−27	23	–			
18	484.106848	408	−74	−4	503.608611	265	−107	−56	526.308987	398	−17	−6
19	483.057035	403	23	99	503.582389	270	3	49	–			
20	482.010721	456	30	105	503.553251	276	3		528.761831	466	−40	−59
21	480.967742	456	−18	47	503.521033	286	−69	−50	529.992091	440	62	25
22	479.927947	509	−69	−22	503.485767	307	27	29	531.224300	387	−47	−99
23	478.891323	461	77	98	503.446977	366	25	14	532.458667	445	86	30
24	477.857113	493	−122	−130	503.404427	350	−98	−107	533.694643	657	161	127
25	476.825688	562	−75	−106	503.358319	403	75	95	534.931730	933	−68	−39
26	475.796493	562	−112	−151	–				536.170203	943	−78	81
27	474.769750	610	212	198	–				–			
28	473.744250	578	−85	−21	–				–			
29	472.721130	710	357	581	–				–			
30	–				–				–			
31	–				–				–			
32	469.653660*		−4079	−2490	–				–			

Tabelle A.11 $D^{12}CP$ $(040)^{2e,f} \leftarrow (030)^{1f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				518.840311	503	−134	−113
2	–				516.554712	636	−268	−254	–			
3	513.126516	594	−270	−250	–				521.119344	546	−162	−146
4	–				516.548800	429	−58	−50	522.257115*		−496	−482
5	510.835111	503	−102	−86	516.544066*		−550	−546	523.394807	371	60	71
6	509.687878	466	−297	−284	516.539646	376	−25	−24	524.530956	286	54	62
7	508.540547	456	226	234	516.534048	339	−52	−56	–			
8	507.391915	286	248	251	516.527993	339	−4	−12	–			
9	506.242020	482	−208	−210	516.521768	313	303	290	527.933283	376	−68	−71
10	505.091936	482	−84	−92	516.514614	297	−9	−27	–			
11	503.941146	461	89	75	516.507630	286	28	5	530.196649	546	136	124
12	502.789342	403	−15	−35	516.500581	286	36	7	531.326559	482	42	25
13	501.636976	435	42	15	516.493610	254	3	−35	532.455424	398	−31	−53
14	500.483865	429	59	26	516.486966	281	8	−44	533.583373	408	57	29
15	499.329877	392	−112	−151	516.480963	223	186	112	534.710066	408	−23	−57
16	498.175483	376	−19	−63	516.475157	281	−100	−208	535.835883	435	118	79
17	497.020384	323	22	−25	516.470605	276	5	−157	536.960367	376	34	−12
18	495.864487	360	−100	−148	516.467401	239	381	136	538.083830	419	45	−8
19	494.708426	350	230	183	516.464629	265	−112	−481	539.206090	398	−22	−82
20	493.551391	360	182	139	–				540.327408	387	101	34
21	492.393604	419	−43	−78	–				541.447432	413	69	−4
22	491.235562	413	31	11	–				542.566409	482	136	57
23	490.076944	477	62	62	–				543.684105	472	73	−12
24	488.917509	519	−214	−186	–				544.800741	636	106	16
25	487.757989	535	−88	−23	–				545.916253	684	173	80
26	486.597926	572	−45	68	–				–			
27	–				–				548.143287	864	−196	−289
28	–				–				549.255568	784	127	39
29	–				–				–			
30	–				–				551.475932	477	58	−7
31	–				–				552.584369	869	12	−31
32	–				–				553.691785	790	95	81
33	–				–				–			
34	–				–				555.903060	1076	118	196
35	–				–				557.006670	1193	−211	−67
36	–				–				558.109234*		−477	−252

Tabelle A.12 $D^{12}CP\ (040)^{2e,f} \leftarrow (030)^{1e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				516.572629*		−454	−440	519.998588	567	−39	8
3	513.162835	572	−194	−171	516.588558	525	63	75	521.155832	562	−100	−44
4	–				516.608934	472	−110	−100	522.318321	525	−126	−63
5	510.925756	466	−218	−191	516.634803	450	76	83	523.486159	509	−65	4
6	509.815332	488	−82	−52	516.665616	424	71	75	–			
7	508.710166	535	−97	−65	516.701476	398	−18	−18	–			
8	507.610766	493	155	188	–				527.021858	488	48	119
9	–				516.788748	350	−33	−41	528.211405	424	21	86
10	505.428551	450	324	354	516.840145	376	32	19	–			
11	504.345860	493	123	148	516.896526	382	−41	−60	530.607764	413	9	53
12	503.269158	366	−71	−53	516.958059	382	−81	−105	531.814771	424	−42	−11
13	502.198695	562	−159	−151	517.024837	323	10	−19	533.027965	419	−14	2
14	–				517.096715	334	90	56	534.247370	403	−43	−39
15	500.077254	445	84	72	517.173510	318	−18	−58	535.473249	429	−34	−40
16	499.026016	382	−203	−225	517.255668	313	137	92	536.705824	408	55	43
17	497.982121	360	1	−28	517.342730	313	102	51	–			
18	496.944935	360	−145	−177	517.434945	302	132	76	539.191272	419	−86	−88
19	495.915348	371	34	4	517.532051	302	−28	−88	540.444930	472	66	80
20	494.893444	302	399	375	517.634402	329	−15	−80	541.705597	620	−197	−160
21	493.878197	382	−310	−323	517.741932	366	112	44	542.974412	1002	46	108
22	492.872079	419	141	142	517.854405	276	128	56	544.250669	578	−136	−50
23	491.873435	450	−149	−136	517.971730	477	−49	−125	545.535034	572	−303	−207
24	–				518.094365	461	50	−28	546.828188	652	−6	75
25	–				518.221957	440	83	4	548.129528	774	−78	−56
26	–				–				549.440155	450	353	246
27	–				–				550.759086	1579	75	−260
28	–				518.634628	456	78	2	552.087865	2629	408	−296
29	–				518.782125	503	66	−5	553.426296*		939	−323
30	–				518.934644	641	126	63	–			
31	–				519.091924	647	18	−34	–			

Tabelle A.13 $D^{12}CP\ (040)^{4e} \leftarrow (030)^{3e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	–				528.941330	1643	−106	−76	533.506329	175	−5	−20
4	–				528.949059	610	66	95	534.654994	185	−41	−59
5	523.252280	509	−116	−101	528.958410	398	−28	0	535.805555	191	−14	−34
6	522.122500	731	−136	−119	528.969789	254	22	47	536.957934	185	9	−12
7	520.995009	1049	184	205	528.982958	276	−23	−1	538.112131	185	42	22
8	519.868930	625	−40	−16	528.998038	239	−37	−21	539.268015	180	−34	−51
9	518.745048	413	−34	−5	529.015039	233	−9	0	540.425796	191	4	−7
10	517.623155	419	−13	21	529.033898	217	1	1	541.585329	191	25	21
11	516.503210	382	−26	15	529.054614	217	−3	−15	542.746588	185	15	22
12	515.385252	419	−42	7	529.077187	201	−18	−44	543.909535	191	−49	−30
13	514.269453	345	103	161	–				545.074338	191	14	49
14	513.155367	334	−45	23	529.128023	207	55	−3	546.240790	196	10	63
15	512.043452	291	−36	43	529.156193	196	62	−15	547.408928	207	−9	63
16	510.933473	307	−112	−21	–				548.578793	170	12	104
17	509.825664	345	−47	56	529.218132	191	141	26	549.750254	196	−46	67
18	508.719687	334	−187	−72	529.251808	201	135	2	550.923375	233	−103	29
19	507.615926	355	−155	−30	529.287381	212	201	52	552.098118	254	−184	−36
20	506.514186	360	−155	−22	529.326381*		1878	1718	553.274535	260	−225	−63
21	505.414152*		−509	−370	529.363222	133	−409	−576	554.452469	286	−367	−197
22	504.316630*		−422	−279	529.405204*		651	482	555.632091	313	−428	−256
23	503.220703*		−817	−674	529.448022*		762	599	556.812968*		−828	−661
24	–				529.493181*		1444	1296	557.995348*		−1306	−1154
25	501.036755	339	27	160	529.538105	350	133	9	–			
26	499.947668	578	181	305	529.585919	382	−30	−122	560.367094	583	26	118
27	498.860177	588	−187	−73	529.635630	392	−23	−74	561.554693	599	92	139
28	497.774608*		−763	−656	529.687001	398	−66	−68	562.743822	583	151	144
29	496.692335	477	−183	−78	529.740282	503	110	161	563.934468	662	199	130
30	495.611729	488	−90	25	529.794936	551	−14	91	565.126618	769	232	99
31	494.533367	482	79	222	529.851238	562	−140	14	566.320050	790	36	−160
32	–				529.909345	668	−90	99	567.515209	827	62	−187
33	492.383043	488	256	551	529.969152	678	56	255	568.711688	774	−91	−374
34	491.310356*		−493	−47	530.030084	769	−253	−81	569.910233	896	328	43
35	490.241266	482	122	793	530.092990	1018	−139	−51	571.109642	1086	121	−117
36	489.172660*		−1030	−36	530.157388	1018	−58	−130	572.310659	1012	32	−89
37	–				530.223040	3069	−215	−552	573.513298	1071	78	167

Tabelle A.14 $D^{12}CP$ $(040)^{4f} \leftarrow (030)^{3e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	–				528.941 330	1643	−106	−157	533.506 329	175	−5	27
4	–				528.949 059	610	66	22	534.654 994	185	−41	−10
5	523.252 280	509	−116	−81	528.958 410	398	−28	−64	535.805 555	191	−14	14
6	522.122 500	731	−136	−103	528.969 789	254	21	−5	536.957 934	185	9	34
7	520.995 009	1049	185	213	528.982 958	276	−24	−39	538.112 131	185	43	62
8	519.868 930	625	−38	−16	528.998 038	239	−40	−43	539.268 015	180	−31	−20
9	518.745 048	413	−29	−17	529.015 039	233	−14	−5	540.425 796	191	9	11
10	517.623 155	419	−3	−3	529.033 898	217	−8	14	541.585 329	191	34	22
11	516.503 210	382	−9	−24	529.054 614	217	−20	17	542.746 588	185	32	4
12	515.385 252	419	−14	−48	529.077 187	201	−46	5	543.909 535	191	−21	−69
13	514.269 453	345	147	92	–				545.074 338	191	58	−13
14	513.155 367	334	23	−57	529.128 023	207	−12	67	546.240 790	196	79	−19
15	512.043 452	291	66	−41	529.156 193	196	−39	54	547.408 928	207	94	−32
16	510.933 473	307	37	−99	–				548.578 793	170	162	5
17	509.825 664	345	166	1	529.218 132	191	−69	49	549.750 254	196	169	−19
18	508.719 687	334	112	−83	529.251 808	201	−160	−30	550.923 375	233	198	−22
19	507.615 926	355	256	33	529.287 381	212	−203	−65	552.098 118	254	230	−21
20	506.514 186	360	401	155	–				553.274 535	260	336	58
21	505.414 152	392	232	−33	529.363 222*		−1135	−983	554.452 469	286	382	81
22	504.316 630*		555	279	529.405 204	223	−304	−148	555.632 091	313	558	241
23	503.220 703*		454	175	529.448 022*		−477	−320	556.812 968	366	455	131
24	–				529.493 181	318	−147	8	557.995 348	488	346	24
25	–				529.540 080	345	87	237	–			
26	499.945 013	578	153	−55	529.588 496	366	4	144	560.364 452	525	41	−237
27	498.857 169	562	91	−63	529.638 834	408	8	135	561.551 345	572	70	−167
28	–				529.690 898	424	−95	14	562.739 598	625	55	−125
29	–				529.744 846	509	−148	−62	563.929 250	662	68	−44
30	–				529.800 965	599	136	192	565.119 988	716	−174	−205
31	–				529.858 510	636	10	29	566.312 543	790	95	150
32	–				529.917 859	721	−150	−175	567.506 054	821	48	191
33	–				529.979 327	710	−31	−110	568.700 702	912	−95	127
34	–				530.042 573	853	23	−121	569.896 449	928	−334	−51
35	–				530.107 389	1240	−202	−423	571.094 197	1039	274	584
36	–				530.173 958*		−526	−839	572.291 683*		−490	−206
37	–				–				573.491 157	1092	−331	−149
38	–				–				574.691 926	1182	105	80

Tabelle A.15 $D^{12}CP$ $(040)^{2e} \leftarrow (030)^{3e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	487.271713	509	153	841	490.699078*		1987	1740	495.263252*		−1210	−353
4	–				490.707016	461	−106	−197	496.415520*		−810	35
5	485.010217	498	−307	250	490.719689	461	−43	156	–			
6	483.883609	572	−322	161	490.734167*		−805	−116	–			
7	–				–				–			
8	–				490.773500	488	−76	50	501.049062*		−1024	−286
9	–				490.796955	498	−130	78	–			
10	479.404986	668	−219	−43	490.823478	440	−33	−98	–			
11	478.292855	684	5	114	490.853120	477	172	−243	504.554269*		−599	54
12	477.183647	731	22	73	490.885672	445	171		–			
13	476.077938	731	292	298	490.920931	493	−351	103	506.906887	445	117	737
14	–				490.960401	541	−13	38	508.087058*		−615	−1
15	473.875765	806	−169	−207	491.003076	382	52	317	509.272034	519	−13	601
16	472.780505	821	27	−6	491.049340	429	89		510.459150*		−879	−262
17	471.688698	694	−123	−132	–			138	–			
18	470.601776*		655	688	491.153345	477	209	−537	–			
19	469.517201	684	−343	−255	491.210929	461	−172	106	514.047018	2565	−76	504
20	468.438393	827	131	281	491.273404	429	109	154	515.251200	917	190	703
21	–				491.343078*		3197	47	516.458979	700	−333	57
22	466.293092	694	−210	44	491.411222	424	192	−2187	–			
23	465.227559*		−437	−174	491.486952	403	43	−112	518.889524	917	−226	−374
24	464.167525	710	−200	11	491.568142*		451		–			
25	463.112364	652	−317	−253	491.653994*		451	8	521.340236*		468	−885
26	462.062825	652	−234	−452	491.744437	498	−198	−309	–			
27	461.020317*		1267	579	491.840791	472	−338	−113	–			
28	–				–			818	–			
29	–				492.050737	610	−212	−998	–			
30	–				492.167801*		3233		–			
31	–				492.284812*		637	249	–			
32	–				492.410828*		940		–			
33	–				492.541833	456	17		–			
34	–				492.680005	488	−45		–			
35	–				492.824840	488	172		–			
36	–				492.977045*		1317		–			

Tabelle A.16 $D^{12}CP$ $(040)^{2f} \leftarrow (030)^{3e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	487.271713	509	166	371	490.699078*		2052	1740	–			
4	–				490.707016	461	89	−197	496.415520	212	−355	−141
5	485.010217	498	−112	60	490.719689*		411	156	–			
6	483.883609	572	134	286	490.734167	461	105	−116	–			
7	–				–				499.884631	572	−229	−51
8	481.636970	631	−277	−169	490.771041	514	192	50	–			
9	480.518568*		719	802	490.792980	376	177	78	502.209301	689	330	483
10	479.401003	763	95	153	490.817050	482	−40	−98	503.375131*		790	931
11	478.286198	631	−205	−173	490.843455	514	−225	−243	504.541714	625	−145	−14
12	477.174198	700	−115	−107	–				–			
13	–				490.903668	488	50	103	–			
14	474.958143*		882	843	490.936841	493	−44	38	508.057023	440	251	371
15	473.852264	758	28	−33	490.972505	519	213	317	–			
16	472.749549	647	53	−28	–				–			
17	471.649091	784	91	−9	491.049340	429	11	138	511.588668	631	−303	−160
18	470.550672	731	−31	−150	491.090190*		−664	−537	512.770421*		520	681
19	469.454484	678	−73	−210	491.134296	498	−13	106	513.952736	1113	263	445
20	468.360761	832	252	95	491.179685	339	52	154	–			
21	467.268718	737	213	35	491.226734	477	−32	47	–			
22	466.178435	652	−48	−251	491.273404*		−2237	−2187	517.508916	170	−309	−44
23	–				491.326063	429	−129	−112	518.698294*		762	1057
24	464.004917*		784	514	–				–			
25	462.920479*		814	495	491.432095	445	59	8	–			
26	461.836865	604	−38	−421	491.486952	403	−231	−309	522.268938	965	−357	8
27	460.756737*		969	505	491.543692	482	−18	−113	523.461768	795	−54	317
28	459.676432	588	255	−313	491.602453*		913	818	–			
29	–				491.659664*		−926	−998	–			
30	–				–				–			
31	–				491.782188	503	172	249	–			

Tabelle A.17 $D^{12}CP$ $(011)^{1e,f} \leftarrow (001)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	524.296894*		−592	−604	–				527.681474	408	1	−13
2	523.170907	594	118	108	–				528.810691	398	−36	−51
3	522.044881	567	122	113	525.447194	180	−21	−46	529.940615	323	23	7
4	520.919495	562	86	78	525.462129	164	−1	−19	531.071062	254	6	−9
5	519.794462*		−286	−293	525.480818	148	47	38	532.202137	233	32	16
6	518.670790	329	1	−5	–				533.333708	228	−20	−36
7	517.547523	276	−19	−23	525.529247	138	22	30	534.465934	217	21	5
8	516.424975	276	−43	−46	525.559053	133	19	35	535.598644	207	−3	−18
9	515.303225	270	−2	−3	525.592507	122	−54	−31	536.731928	185	10	−5
10	514.182247	281	67	67	525.629741	127	−62	−35	537.865697	185	−16	−30
11	–				–				538.999989	175	−30	−43
12	511.942435	239	76	79	525.715430	133	11	34	540.134804	185	−20	−31
13	510.823550	212	−55	−51	525.763741	122	−46	−31	541.270313	170	199	189
14	509.705566	223	−70	−65	525.815871	143	16	14	542.405808	201	−68	−77
15	508.588479	233	18	24	525.871636	148	17	−9	543.542114	212	17	10
16	507.472045	233	−45	−39	525.931182	148	108	47	544.678747	217	−17	−22
17	506.356540	228	7	13	525.994285	175	69	−38	545.815877	212	14	12
18	505.241859	233	60	66	–				546.953373	207	−7	−7
19	504.127904	228	6	12	–				548.091301	212	−1	1
20	503.014831	228	−8	−2	–				549.229595	212	−20	−15
21	–				–				550.368294	223	−11	−3
22	500.791596*		313	316	–				551.507372	223	14	25
23	499.680832	260	28	29	–				552.646726	233	−33	−18
24	498.571127	260	−76	−77	–				553.786445	244	−50	−31
25	497.462521	291	32	29	–				554.926544	260	−7	16
26	496.354641	281	−28	−35	–				556.066865	291	−46	−20
27	495.247630	318	−122	−134	–				557.207487	291	−76	−44
28	494.140927*		−821	−837	–				558.348514	360	24	60
29	493.036865	355	202	180	–				559.489659	371	−18	22
30	491.932555	371	49	21	–				560.631092	435	−19	27
31	490.829409	408	124	88	–				–			
32	489.727192	445	185	141	–				562.914585	546	−69	−13
33	488.625661	477	−20	−73	–				564.056737	594	4	66
34	487.525268	498	−45	−109	–				565.198837	673	−159	−92
35	486.425908	535	−4	−79	–				566.341721	710	292	366
36	485.327378	594	−106	−195	–				567.483847	716	−166	−87
37	484.230176	599	139	36	–				568.626731	700	−4	82

... Fortsetzung auf der nächsten Seite

Tabelle A.17 Fortsetzung von $D^{12}CP\ (011)^{1e,f} \leftarrow (001)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
38	483.134 080*		502	384	–				569.769 276	859	−302	−209
39	482.038 395	710	281	146	–				570.912 500	986	−26	74
40	–				–				572.055 502	1134	−60	47
41	–				–				573.198 674	975	4	118

Tabelle A.18 $D^{12}CP\ (001)^{0e} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				706.742 122	226	215		–			
2	704.477 305	299	−71	−72	706.723 100	183	4	−6	710.114 074	385	−16	−14
3	703.330 830	183	13	11	706.694 844	159	−36	−46	711.222 144	289	8	10
4	702.177 974	212	95	92	706.657 277	130	17	8	712.323 767	275	44	45
5	–				706.610 221	116	−16	−25	713.418 876	222	34	36
6	699.852 905	164	−12	−17	706.553 841	101	28	20	714.507 329	183	−151	−150
7	698.680 875	140	−42	−48	706.488 011	101	22	15	715.589 661	183	34	34
8	697.502 595	135	8	1	706.412 759	96	−9	−15	716.665 284	178	11	10
9	696.317 938	135	−2	−9	706.328 182	92	31	26	717.734 407	173	1	−2
10	695.127 031	140	44	36	706.234 136	87	−5	−9	–			
11	–				706.130 739	87	−2	−4	–			−432
12	692.726 238	145	20	12	706.017 965	87	11	10	720.902 632	178	0	−7
13	691.516 472	140	44	38	705.895 788	87	4	5	721.945 664	241	49	41
14	690.300 434	120	51	46	–				722.982 052	294	16	7
15	689.078 092	130	−6	−9	705.622 524*		−784		724.011 927	284	43	33
16	687.849 591	135	5	6	705.473 000	87	−11		725.035 210	313	60	49
17	686.614 832	145	−28	−23	705.313 334	87	−12	−3	726.051 903	443	79	67
18	685.373 860	130	−73	−63	705.144 303	92	−17	−4	727.062 029	511	132	119
19	684.126 807	140	−13	3	704.965 903	92	−33	−18	728.065 251	612	−110	−122
20	682.873 523	125	−10	13	704.778 000	63	−201		729.062 012	713	−192	−204
21	681.614 085	149	−2	30	704.581 087	106	−32	−12	730.052 443	525	24	13
22	680.348 297	106	−199	−156	704.374 673	111	−25	−2	–			
23	679.076 788	120	15	70	704.158 934	116	−8	18	–			−385
24	677.798 916	145	−17	51	703.934 190	63	331	359	732.983 337	795	133	131
25	676.515 042	207	52	135	703.699 461	125	5	36	733.946 682	824	−135	−132
26	–				703.455 904	125	165	199	734.903 698	655	−59	−51
27	673.928 819	125	−35	86	703.203 043	111	328	363	735.854 149	670	132	147
28	672.626 595	202	−94	49	702.940 352	169	−41	−4	736.797 498	636	−91	−67
29	671.318 271	87	−209	−42	702.668 723	169	−57	−18	–			−318
30	–				702.387 808	173	−76	−37	738.664 487	660	−146	−102
31	–				702.097 667	231	−47	−8	739.587 918	622	−172	−115
32	–				701.798 259	236	−19	19	740.504 562	925	−265	−193
33	–				701.489 592	251	7	43	–			
34	–				701.171 476	275	−168	−136	–			
35	–				700.844 447	323	−19	9	743.214 511	747	−128	1
36	–				–				744.104 436	805	17	170
37	–				700.162 402	390	−31	−19	744.987 128	1007	−313	−134
38	–				699.807 203	332	−395	−395	745.863 660	891	−38	169
39	–				699.443 437	520	−129	−143	746.733 025	3103	−159	79
40	–				699.070 549	655	202	171	–			
41	–				698.687 997	381	45	−6	748.451 812	2067	−1	
42	–				698.296 858	381	466		749.300 879	1417	−64	
43	–				–				750.142 506*		−768	

Tabelle A.19 $D^{12}CP$ $(011)^{1e,f} \leftarrow (020)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	718.191584*		2299	−274	–				721.574516*		1244	63
2	–				–				–			
3	715.888565*		2850	135	–				723.781344	1036	−204	−167
4	714.721891*		2174	−277	–				724.870660*		−704	−129
5	713.546233*		1952	23	–				725.951553	2939	−85	889
6	–				719.191471	689	−318	−46	–			
7	711.165306	217	68	10	719.147279*		359	632	–			
8	709.960379*		−1332	−43	719.095541	626	−186	81	–			
9	708.746008*		−2900	−15	719.037958	434	−284	−35	730.178334*		735	7
10	–				718.974149	530	−355	−136	731.213113*		2699	52
11	–				718.904455	501	−101	76	732.240399*		6581	1047
12	–				718.828522	530	78	202	733.258883*		11035	1394
13	–				718.746273	670	54	115	–			
14	–				718.657811	665	−124	−133	735.270021*		22065	−720
15	–				718.563439	703	−213	−290	736.266729*		32599	−6
16	–				–				–			
17	–				718.359339*		1997	1824	–			
18	–				718.245558	636	104	−68	–			
19	–				718.127971	660	131	16	–			
20	–				718.004892	670	311	337	–			
21	–				717.875430	332	−328	−50	–			

Tabelle A.20 $D^{12}CP$ $(110)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	2408.143662	564	−329	−225	2413.775640	396	−94	−1
3	2406.995476	420	33	133	2414.880068	276	267	352
4	2405.839535	348	12	107	2415.976409	288	−4	73
5	2404.676339	252	98	186	2417.065549	252	−6	60
6	2403.505110*		−497	−417	2418.147211	228	−5	50
7	2402.327567	240	−64	6	2419.221396	216	15	57
8	2401.142269	228	−54	5	2420.287881	204	−156	−126
9	2399.949716	216	23	69	2421.347166	204	−3	13
10	2398.750127	180	376	410	2422.398751	192	−13	−11
11	2397.542507	204	2	22	2423.442804	192	−3	−14
12	2396.327908	204	−57	−50	2424.479212	192	−71	−95
13	2395.106164	204	25	19	2425.508143	180	−34	−69
14	2393.876997	204	−37	−56	2426.529485	192	12	−34
15	2392.640574	204	−86	−117	2427.543128	192	−28	−82
16	2391.397061	204	37	−5	2428.549183	204	−26	−87
17	2390.146126	204	−6	−58	2429.547594	204	−23	−88
18	2388.887990	216	−3	−62	2430.538305	204	−56	−123
19	2387.622598	228	−14	−79	2431.521428	216	2	−64
20	2386.350005	228	8	−60	2432.496796	228	3	−60
21	2385.070100	240	−53	−122	2433.464465	228	19	−37
22	2383.783106	264	21	−47	2434.424380	240	15	−31
23	–				2435.376540	252	7	−26
24	2381.187349	288	47	−10	2436.321055	264	125	108
25	2379.878586	276	−9	−57	2437.257540	288	3	6
26	2378.563066	276	381	346	2438.186325	300	−9	15
27	2377.239570	360	−4	−24	2439.107244	324	−58	−9
28	2375.909205	264	−61	−64	2440.020354	348	−65	10
29	2374.571860	336	96	112	2440.925654	372	−12	91
30	–				2441.822922	396	−97	34
31	2371.875071	468	−118	−61	2442.712435	432	−23	135
32	2370.516181	396	62	139	2443.593861	468	−99	85
33	–				2444.467422	492	−80	128
34	–				2445.332951	552	−109	117
35	–				2446.190227	588	−385	−146
36	–				–			
37	–				2447.881350	672	−244	−7
38	2362.210761	636	−28	96	2448.714919	732	−55	162
39	2360.800911*		−498	−396	–			
40	2359.384995	672	158	225	2450.357187	828	−193	−67
41	2357.960771	744	−298	−284	2451.165442*		−910	−862
42	2356.530372	768	272	211	2451.966830	912	−303	−358
43	2355.092189	372	262	103	2452.760518*		826	634
44	2353.646446	708	−99	−384	2453.544291	1020	289	−74
45	2352.194693*		747	302	2454.320808*		777	202
46	2350.733857	1392	−268	−911	2455.087632	1092	−116	−951

Tabelle A.21 $D^{12}CP$ $(110)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				2412.669 440*		−877	−803
2	2408.138 456*		414	495	2413.784 835	396	−94	−25
3	2406.986 558	420	−19	61	–			
4	2405.827 793	336	18	95	2415.991 918	276	−2	53
5	2404.661 660	300	12	84	2417.084 603	240	331	377
6	2403.488 216	264	9	76	2418.169 091	240	−88	−50
7	2402.307 460	240	−2	58	2419.246 654	216	28	55
8	2401.119 393	228	−30	21	2420.316 574	204	−26	−9
9	2399.924 070	216	−32	11	2421.379 514*		427	433
10	2398.721 435	216	−71	−38	2422.434 035	192	−38	−43
11	2397.511 599	204	−48	−24	2423.481 522	192	−21	−36
12	2396.294 508	204	−24	−11	2424.521 475	192	−8	−33
13	2395.070 160	204	−12	−9	2425.553 674	192	−204	−238
14	2393.838 611	204	36	29	2426.578 672	192	−40	−83
15	2392.599 751	204	2	−16	2427.595 971	192	1	−50
16	2391.353 690	204	−13	−40	2428.605 681	204	45	−12
17	–				2429.607 748	204	53	−8
18	–				2430.602 115	204	−14	−78
19	2387.572 303	216	−17	−68	2431.588 949	216	27	−38
20	2386.297 495	228	26	−31	2432.568 084	228	27	−37
21	2385.015 319	204	−115	−177	2433.539 519	228	1	−59
22	2383.726 276	252	53	−12	2434.503 311	240	26	−30
23	2382.429 920	240	80	12	2435.459 404	252	61	14
24	2381.126 309	288	17	−52	2436.407 741	276	70	32
25	–				2437.348 269	288	17	−10
26	2378.497 816	336	92	25	2438.280 765	288	−301	−316
27	2377.172 769	360	56	−10	2439.206 116	324	21	19
28	–				2440.123 325	348	6	19
29	2374.501 238	372	−22	−84	2441.032 779	372	61	89
30	–				2441.934 312	396	41	83
31	2371.801 569	444	310	250	2442.827 979	432	21	77
32	2370.440 573	300	12	−49	2443.713 837	468	79	146
33	–				2444.591 829	504	181	256
34	–				2445.461 235	396	−372	−294
35	–				2446.323 607	564	−5	70
36	–				2447.177 726	624	86	150
37	–				2448.023 038*		−631	−586
38	–				2448.861 814	720	141	154
39	–				2449.692 669*		1040	1008
40	–				–			
41	–				2451.327 958*		663	489
42	–				2452.132 613	948	−341	−618
43	–				2452.930 621	996	160	−246

Tabelle A.22 $D^{12}CP$ $(012)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				2464.572 782	1368	−385	−336
2	2460.058 692*		−1056	−1029	2465.674 219	1224	−240	−183
3	2458.904 524	936	136	161	2466.764 578	1224	−327	−261
4	2457.737 893	816	−356	−333	2467.844 689	1128	196	270
5	–				2468.913 113	1092	−102	−18
6	2455.373 723	756	36	57	2469.971 124	1056	62	156
7	2454.175 408	696	117	139	2471.017 890	996	−133	−30
8	2452.965 960	660	−209	−186	2472.053 967	984	−124	−11
9	2451.746 321	624	−15	10	2473.079 075	936	−182	−61
10	2450.515 326*		−479	−452	2474.093 494	936	−20	110
11	2449.274 693	576	100	129	2475.096 668	936	−185	−48
12	2448.023 038	456	324	356	2476.089 374	924	106	249
13	2446.759 972	540	−212	−178	2477.070 613	924	−139	8
14	2445.487 103	516	84	120	2478.041 273	936	−26	124
15	2444.203 099	516	−136	−99	2479.000 745	936	−158	−7
16	2442.909 237	480	388	425	2479.949 526	996	−32	117
17	2441.603 964	468	85	122	2480.887 118	1008	−141	4
18	2440.288 222	504	−119	−84	2481.813 964	1044	−37	101
19	2438.962 233	504	−21	11	2482.729 733	1068	−48	81
20	–				2483.634 478	1164	−116	0
21	2436.278 571	528	64	85	2484.528 257	1188	−180	−79
22	2434.920 733	540	−153	−139	2485.411 178	1272	−129	−46
23	2433.552 702	552	−89	−84	2486.283 133	1344	−68	−7
24	2432.174 258	564	15	8	2487.144 342	1428	224	261
25	2430.785 401	588	138	119	2487.993 808	1428	−247	−238
26	2429.387 128*		1255	1223	2488.833 027	1644	14	−5
27	2427.976 115	612	22	−25	2489.661 223	1728	233	183
28	2426.555 907	612	−38	−101	2490.477 732	1860	−254	−336
29	–				2491.283 993	1920	−8	−124
30	–				2492.079 565*		528	379
31	–				2492.863 116	2100	21	−159
32	–				2493.636 088	2232	−89	−299
33	–				2494.398 702	2160	416	179
34	–				2495.149 685	2388	260	2
35	–				2495.889 478	2304	−119	−392
36	–				2496.620 132*		1324	1044
37	–				2497.337 270	2484	208	−67
38	–				2498.045 048*		684	425
39	–				2498.740 418	2568	−304	−530
40	–				2499.427 147*		1004	830

Tabelle A.23 $D^{12}CP$ $(012)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–				2465.684 854	1224	386	367
3	2458.895 274*		−653	−699	2466.778 481	1224	−112	−122
4	2457.727 922*		609	563	2467.861 971	1092	−62	−63
5	2456.548 164	780	58	13	2468.934 660	1068	−119	−110
6	2455.358 379	756	59	16	2469.996 770	1044	−51	−31
7	2454.157 905	708	−63	−103	2471.048 134	1008	−16	15
8	2452.946 463*		−602	−638	2472.088 807	960	49	92
9	2451.725 439	624	−186	−217	2473.118 624	936	−12	42
10	2450.493 668	600	4	−21	2474.137 806	948	28	93
11	2449.250 986	576	−210	−230	2475.146 021	924	−155	−79
12	2447.998 112	564	−126	−140	2476.143 712	936	−112	−25
13	2446.734 881	540	75	68	2477.130 601	924	−114	−17
14	2445.461 235	396	319	317	2478.106 800	936	−43	63
15	2444.176 623	516	37	40	2479.072 198	936	−4	108
16	2442.881 929	516	95	104	2480.026 629	984	−160	−41
17	2441.576 601	504	−76	−63	2480.970 480	1020	−118	5
18	–				2481.903 420	1044	−205	−79
19	2438.935 313	516	90	108	2482.825 779	1068	−88	38
20	2437.599 187	456	222	241	2483.737 283	1128	−37	88
21	2436.252 371	528	−8	11	2484.637 874	1224	−109	13
22	2434.895 253	540	−233	−215	2485.527 498	1296	−354	−238
23	2433.528 275	540	−30	−16	2486.406 709	1344	−216	−109
24	2432.151 161	552	302	312	2487.275 174	1344	−29	69
25	2430.762 857	576	−311	−309	2488.132 505	1488	−178	−92
26	–				2488.979 479	1524	112	185
27	2427.957 060	612	−85	−100	2489.815 042	1764	−211	−154
28	–				2490.640 358	1716	14	56
29	2425.110 274	648	−144	−181	2491.454 706	1764	67	92
30	2423.671 898	672	47	−2	2492.258 919*		777	785
31	2422.223 496	696	316	255	2493.050 502	2100	−352	−360
32	2420.764 460	744	28	−44	2493.832 890	2160	111	89
33	2419.296 561*		930	847	2494.604 422*		502	468
34	2417.818 857*		2052	1960	2495.363 934	2232	−348	−390
35	–				2496.114 252	2484	384	338
36	–				2496.852 549	2484	−137	−179
37	–				2497.581 099	2580	360	329
38	–				2498.297 739	2580	−297	−307
39	–				2499.006 126*		1543	1566

Tabelle A.24 $D^{12}CP$ $(002)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				2463.695 402	1380	34	31
1	2461.439 742	1320	105	100	2464.807 640	804	39	91
2	2460.296 264	732	102	41	2465.909 298	576	−101	8
3	2459.142 262	528	−34	16	2467.000 820	456	68	68
4	2457.978 068	432	16	67	2468.081 651	384	1	3
5	2456.803 405	360	−38	69	2469.152 070	336	−16	−13
6	2455.618 440	324	−43	10	2470.212 074	312	24	−26
7	2454.423 227	288	41	−14	2471.261 555	288	20	−28
8	2453.217 324*		−241	−241	2472.300 567	276	33	−14
9	2452.001 617	252	−21	−19	2473.328 999	264	−43	−31
10	2450.775 441	240	21	26	2474.347 073	252	23	−19
11	2449.538 908	240	−18	−12	2475.354 568	252	12	−27
12	2448.292 182	228	7	−40	2476.351 594	252	41	4
13	2447.035 209	228	26	−19	2477.338 040	252	2	−33
14	2445.767 989	228	20	−22	2478.314 018	252	11	−22
15	2444.490 467	228	−85	−15	2479.279 416	252	−41	−17
16	2443.202 919	228	−31	−14	2480.234 345	264	−41	−16
17	2441.905 234	228	50	−42	2481.178 806	264	14	−16
18	2440.597 191	228	−84	−62	2482.112 687	276	13	−16
19	2439.279 289	240	45	13	2483.035 988	288	−44	−17
20	2437.951 085	252	−26	−2	2483.948 876	312	10	−18
21	2436.613 020	252	119	89	2484.851 185	324	8	−22
22	2435.264 598	276	−38	44	2485.742 969	348	2	−27
23	2433.906 317	288	−22	4	2486.624 229	372	−8	16
24	2432.538 009	300	−27	−1	2487.495 020	408	29	−5
25	2431.159 732	324	−19	6	2488.355 232	444	−1	17
26	2429.771 539	348	29	52	2489.205 031	480	64	23
27	2428.373 321	384	−20	2	2490.044 194	540	−4	62
28	2426.965 354	396	84	49	2490.872 944	600	12	17
29	2425.546 309*		−1016	−999	2491.691 170	660	−7	−7
30	2424.119 510	492	−25	42	2492.498 983	756	44	37
31	2422.681 854	552	−76	−14	2493.296 271	840	44	−25
32	2421.234 505	612	−36	21	2494.082 980	996	−71	−37
33	2419.777 517	684	119	5	2494.859 331	1164	−90	−64
34	2418.310 338	636	−196	−40	2495.625 324	1320	−24	−61
35	2416.834 186	864	204	75	2496.380 793	1524	−50	−40
36	2415.347 731	996	−45	40	2497.126 180	1764	260	−14
37	2413.852 026	1140	76	42	2497.860 933	2100	341	3
38	2412.346 351	1344	−189	−11	2498.584 940	2568	65	108
39	2410.831 370	1572	−214	12	2499.298 534	2784	−250	63
40	2409.307 139	1692	21	−38	2500.002 711	3348	375	74
41	2407.773 380	1944	199	133	2500.696 198	4776	649	12
42	2406.229 486	2268	−328	−290	2501.378 385	4452	−58	−30
43	2404.676 452*		−605		2502.051 045	5136	8	37
44	–			−91	2502.714 067	6684	714	−137
45	2401.543 907	3648	366	−106	2503.366 067	8352	653	−78
46	–				2504.005 770*		−1472	470
47	2398.373 030	1224	47	26	2504.638 106*		−758	−458
48	2396.774 133	1380	206	193	2505.260 635	2028	330	383
49	2395.165 597	1608	−153	−152	2505.871 258	2088	−336	−248
50	2393.548 477	1572	−24	−4	2506.472 964	2232	206	338
51	2391.921 940	2004	−290	−244	2507.063 314	2304	−514	−329
52	2390.287 260	2196	271	350	–			

Tabelle A.25 $D^{12}CP$ $(100)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				2420.552317	372	23	267
1	–			301	2421.669817	228	50	236
2	2417.153179	228	91	227	2422.779452	168	29	159
3	2416.004550	168	88	168	2423.881276	156	28	157
4	2414.848110	144	34	117	2424.975291	132	62	79
5	2413.683972	132	33	60	2426.061384	132	31	47
6	2412.512079	132	17	45	2427.139612	132	7	−33
7	2411.332486	132	33	7	2428.209975	120	4	−93
8	2410.145084	120	−37	−63	2429.272417	120	−18	−117
9	2408.950093	120	19	−62	2430.326938	120	−44	−145
10	2407.747292	120	−28	−110	2431.373594	120	−3	−104
11	2406.536847	120	−20	−102	2432.412218	120	−44	−92
12	2405.318703	120	−18	−45	2433.442921	120	−40	−144
13	2404.092859	120	−30	−168	2434.465648	120	−28	−133
14	2402.859317	120	−60	−32	2435.480344	120	−45	−96
15	2401.618185	120	−5	−144	2436.487063	120	−18	−71
16	2400.369300	120	−32	−117	2437.485695	120	−40	−149
17	2399.112770	120	−39	−126	2438.476351	120	22	−89
18	2397.848597	120	−27	−116	2439.458809	132	−35	−92
19	2396.577001	120	221	240	2440.433236	132	−24	−82
20	2395.297263	120	−18	−58	2441.399520	132	−35	−40
21	2394.010157	120	29	−68	2442.357718	132	11	−52
22	2392.715353	132	29	−73	2443.307717	132	22	−42
23	2391.412850	132	−19	−14	2444.249464	144	−30	14
24	2390.102591	132	−173	−228	2445.183068	144	−15	−28
25	2388.785021	144	13	7	2446.108474	156	39	23
26	2387.459642	144	40	27	2447.025516	156	−12	25
27	2386.126784	144	241	220	2447.934361	168	26	60
28	2384.785895	156	64	91	2448.834841	192	12	43
29	2383.437473	168	12	83	2449.726958	204	−27	55
30	2382.081407	192	−25	36	2450.610821	228	46	69
31	–				2451.486155	252	−15	113
32	2379.346399	228	22	57	2452.353180	276	39	105
33	2377.967235	252	−105	−29	2453.212117*		458	741
34	2376.580649	288	25	29	2454.061639	360	−54	109
35	2375.186197	336	−23	18	2454.903184	420	−27	72
36	2373.784102	360	−19	2	2455.736199	480	17	52
37	2372.374252	420	−66	43	2456.560629	528	57	80
38	2370.956868	516	65	39	2457.376307	636	−40	81
39	2369.531564	612	0	−55	2458.183344	768	−128	32
40	2368.098503	192	−87	−117	2458.981907	876	−5	26
41	–				2459.771662	1068	32	42
42	–				2460.552555	1224	−32	65
43	–				2461.324807	1500	62	−36
44	–				2462.088141	1872	76	−109
45	–				2462.842499	588	−5	−59
46	–				–			
47	–				2464.324523	792	−51	−198
48	–				2465.052241	924	124	−79
49	–				2465.770543	1056	−61	−330
50	–				2466.480038	1188	48	−294
51	–				2467.180781*		556	129
52	–				2467.872274*		1013	491
53	–				2468.553242	1608	196	−435
54	–				2469.225958	1920	429	−325
55	–				2469.890476*		1820	929
56	–				2470.544414*		2042	996

Tabelle A.26 $D^{12}CP$ $(200)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				4790.171553	578	321	309
1	4787.919731	578	−122	−129	4791.275419*		659	644
2	4786.772163	318	137	133	4792.363463	217	−35	−53
3	4785.609444	217	−12	−14	4793.437382	170	−50	−70
4	4784.432315	175	163	163	4794.496554	143	6	−17
5	4783.240103	143	−21	−20	4795.540845	127	14	−12
6	4782.033413	127	32	35	4796.570272	111	6	−23
7	4780.811876	117	−55	−52	4797.584750	106	−87	−118
8	4779.575844	111	62	67	4798.584549	101	22	−12
9	4778.324948	101	8	13	4799.569281	95	−37	−73
10	4777.059423	101	11	16	4800.539234	90	41	3
11	4775.779269	95	66	71	4801.494103	90	−30	−70
12	4774.484250	95	−68	−63	4802.434024	90	−94	−134
13	4773.174821	95	61	65	4803.359164	90	37	−4
14	4771.850511	95	−23	−19	4804.269188	90	48	7
15	4770.511572	95	−69	−66	4805.164096	90	−38	−77
16	4769.158105	101	22	24	4806.044054	95	−32	−70
17	4767.789891	101	29	31	4806.908897	95	−76	−110
18	4766.406947	106	−28	−28	4807.758723	101	−46	−76
19	4765.009492	111	68	67	4808.593500	101	51	26
20	4763.597274	117	68	66	4809.413026	106	40	21
21	4762.170392	122	75	72	4810.217335	117	−17	−28
22	4760.728681	127	−74	−78	4811.006543	122	25	22
23	4759.272541	138	27	22	4811.781089*		634	642
24	4757.801588	148	1	−6	4812.538989	143	−141	−122
25	4756.316040	164	71	64	4813.282477	159	−34	−3
26	4754.815778	180	129	119	4814.010547	175	−18	26
27	4753.300938	185	319	307	4814.723332	180	76	134
28	4751.770713	233	−155	−170	4815.420512	217	−35	36
29	4750.226345	270	−38	−57	4816.102375	228	−24	60
30	4748.667047	313	−102	−128	4816.768599	265	−175	−79
31	4747.093153	350	0	−33	4817.419505	318	−124	−18
32	4745.504377	424	1	−44	4818.054823	345	−98	15
33	4743.900788	488	−12	−73	4818.674588	382	−16	98
34	4742.282637	647	233	151	4819.278345	493	−287	−177
35	4740.649142	800	−23	−133	4819.867035	583	80	178
36	4739.001364	996	304	157	4820.437498*		−2023	−1948
37	4737.338376	1362	314	120	4820.996511	869	234	273
38	4735.660078	2040	−64	−318	4821.537464	869	298	285
39	4733.967689	4187	420	90	4822.062258	1155	129	43
40	4732.259485	4213	76	−350	4822.571162	1161	58	−127
41	4730.538099*		1573	1028	4823.064663	1749	635	322
42	4728.799015	437590	433	−259	4823.541030	1749	199	−279
43	4727.045815	4378	280	−592	4824.001826	3493	381	−303
44	4725.279045*		1705	614	4824.446800*		1006	64
45	4723.493729	4526	−220	−1577	4824.876690*		2889	1630
46	4721.697306*		1995	319	4825.286907*		1523	−122
47	4719.881134	2369	−236	−2295	4825.682579*		2121	9
48	4718.054696*		2627	113	–			
49	4716.205861*		−1482	−4538	–			

Tabelle A.27 $D^{12}CP$ $(102)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				4833.390677	1744	−165	−169
1	4831.144993*		512	512	4834.484286	1161	−51	−56
2	4829.991657	1166	21	22	4835.558155	875	128	123
3	4828.818614	875	−418	−415	4836.611677	578	−225	−231
4	4827.626620	694	−60	−55	4837.645761	493	−191	−197
5	4826.414718	498	124	133	4838.660156	435	−13	−18
6	4825.182823	493	38	49	4839.654439	387	−104	−108
7	4823.931203	435	−66	−52	4840.629150	313	85	81
8	4822.660062	387	4	21	4841.583650	318	−79	−81
9	4821.369281	345	112	132	4842.518526	318	−1	−1
10	4820.058709	350	94	118	4843.433527	286	75	77
11	4818.728396	313	−16	11	4844.328518	291	21	25
12	4817.378594	318	18	47	4845.203635	291	−22	−16
13	4816.009136	313	12	44	4846.058943	286	17	25
14	4814.620088	313	15	50	4846.894191	286	−109	−98
15	4813.211384	313	−56	−20	4847.709900	291	126	139
16	–				4848.505347	291	2	17
17	4810.335409	345	−93	−54	4849.281019	286	8	25
18	4808.868290	345	55	94	4850.036783	313	16	34
19	4807.381447	345	−15	22	4850.772638	318	24	43
20	4805.875283	382	79	114	4851.488634	350	84	104
21	4804.349463	387	−20	12	4852.184571	387	−4	16
22	4802.804305	429	−14	13	4852.860665	382	−24	−5
23	4801.239727	498	−9	12	4853.516834	435	−60	−43
24	4799.655660	493	−98	−85	4854.153212	435	20	35
25	4798.053180*		772	776	4854.769513	498	−73	−62
26	4796.429548	578	−163	−171	4855.366123	493	42	49
27	4794.787553	694	−141	−163	4855.941698*		−982	−981
28	4793.126541	869	158	120	4856.499348	694	−44	−48
29	4791.445922	869	115	59	4857.036283	700	61	51
30	–				4857.552989	875	−190	−206
31	4788.026993	1161	18	−79	4858.050189	869	−84	−105
32	–				4858.527632	1161	118	92
33	4784.531388	1749	−55	−198	–			
34	4782.755312	1754	315	149	4859.422405	1161	−86	−110
35	4780.959007	3514	−469	−658	4859.840323	1744	68	51
36	4779.145886*		967	757	4860.238349	1749	124	120
37	4777.311664	3540	302	74	4860.616803	1749	384	402
38	4775.459045	3530	200	−42	4860.974860	1749	1	53
39	4773.587544	355190	133	−115	4861.313445	1744	−122	−21
40	4771.698134*		1031	786	4861.632677	3482	110	278
41	4769.789337*		1372	1142	–			
42	4767.861321*		1276	1077	–			
43	4765.913665	360130	271	124	4862.470834*		−766	−244
44	4763.947630*		−432	−504	–			

Tabelle A.28 $D^{12}CP$ $(004)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				4917.224 057*		−3084	−3138
2	4912.734 807	3434	−355	−429	4918.297 085*		−2665	−2713
3	4911.559 814*		−2023	−2100	4919.353 600*		1416	1374
4	4910.368 443	3440	39	−42	4920.383 918	3413	−516	−552
5	4909.154 203	3429	−673	−757	4921.396 177	1707	−315	−344
6	4907.921 366	3429	99	11	4922.388 359	1712	10	−13
7	4906.666 972	3445	−620	−710	4923.359 522	1707	−476	−494
8	4905.394 520	1712	656	563	4924.311 448	1701	16	3
9	4904.100 443	1722	342	247	–			
10	4902.785 650	1717	−667	−765	4926.153 995	1707	364	358
11	4901.453 100	1722	570	470	4927.044 446	1701	60	57
12	4900.099 230	1722	474	371	4927.914 820	1701	−84	−86
13	4898.726 022*		1009	902	4928.766 026*		843	841
14	4897.331 156	1728	−164	−275	–			
15	4895.917 693	1717	−3	−118	4930.404 842	1696	−165	−172
16	4894.483 985	1728	−176	−295	4931.194 236	1701	−312	−323
17	4893.030 268	1722	−466	−591	4931.963 519	1707	−321	−338
18	4891.557 246	1733	−191	−322	4932.713 666	1701	784	759
19	4890.065 056	1722	765	627	4933.442 190	1696	515	483
20	4888.551 275	1733	−44	−188	4934.150 334	1701	116	74
21	4887.018 662	1728	119	−32	4934.838 401	1707	−113	−164
22	–				4935.505 920	1701	−644	−705
23	4883.893 944	1728	269	106	4936.154 034	1696	−337	−407
24	4882.301 587	3477	−46	−213	4936.781 567	1696	−371	−450
25	4880.689 758	3461	−127	−297	4937.390 402*		1131	1047
26	4879.059 181	3482	723	552	4937.976 806	3408	432	346
27	4877.407 434	3466	55	−113	4938.542 326*		−926	−1010
28	–				4939.089 483	3397	−429	−506
29	4874.046 701	3471	322	175	4939.616 631	3397	269	207
30	–				4940.124 745*		2135	2098
31	4870.607 140	3482	24	−73	4940.608 914	3403	249	248
32	4868.857 429	3482	−783	−840	–			
33	–				–			
34	4865.302 619	3477	600	665	–			

Tabelle A.29 $D^{12}CP$ $(120)^{0e} \leftarrow (020)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				2403.299 557	25	−40	−150
2	–				2404.415 339*		−332	−422
3	2397.612 133	27	93	−70	2405.524 364	54	−195	−265
4	2396.452 924*		−279	−442	2406.626 244	77	−1	−48
5	–				2407.720 923	104	212	190
6	2394.114 178	85	−146	−302	2408.807 792	128	−146	−142
7	2392.934 419	119	108	−39	2409.887 848	160	−61	−30
8	2391.747 405	157	137	2	2410.960 648	196	44	103
9	–				2412.026 137	233	133	219
10	2389.352 382	250	236	136	2413.083 981	270	−109	4
11	2388.143 931	301	−161	−240	2414.134 404*		−438	−299
12	2386.929 055	366	−5	−60	2415.178 068	354	−171	−8
13	2385.707 311	437	250	221	–			
14	2384.478 089	510	−18	−20	–			
15	–				–			
16	2381.999 427	682	49	103	2419.277 673	541	−190	39
17	–				–			
18	2379.492 959	882	3	110	–			
19	–				–			
20	2376.958 741	1110	−177	−28	–			
21	–				2424.233 999	788	−340	−150
22	2374.397 436	1374	107	272	2425.203 053	841	53	212
23	2373.105 955	1511	−268	−108	2426.163 798	885	−263	−145
24	–				2427.118 063*		565	632
25	2370.503 275	1819	−143	−34	2428.063 410	981	123	129
26	–				2429.000 946*		−459	−524
27	–				2429.932 335*		510	363
28	–				2430.854 418	1101	−106	−346
29	–				2431.769 798	1141	320	−21
30	–				–			
31	–				–			
32	–				–			
33	–				2435.352 112	1257	772	−56
34	–				2436.227 778	1272	582	−377
35	–				2437.096 631*		1473	381

Tabelle A.30 $D^{12}CP$ $(120)^{2e} \leftarrow (020)^{2e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	2397.312083	1572	−312	−435	2405.224426	1068	372	531
4	–				2406.325807	936	18	209
5	2394.988071	1200	48	−169	2407.420209	816	−166	53
6	–				2408.507854	792	50	295
7	–				2409.587688	720	−381	−114
8	–				2410.661097	696	−64	222
9	2390.254691	936	208	−200	2411.726364*		−710	−408
10	2389.053995	900	517	63	2412.785317	624	−482	−168
11	2387.845987	912	547	49	–			
12	2386.631000	888	623	83	–			
13	2385.408923*		625	47	2415.917529*		−1243	−910
14	–				2416.947346*		−1324	−990
15	2382.943943*		822	180	2417.969685*		−1656	−1325
16	2381.701150*		1110	444	–			
17	2380.451212*		1238	555	–			
18	2379.194571*		1639	946	2420.995604	672	−317	−10
19	2377.929124	480	201	−492	2421.989639	684	29	322
20	–				–			
21	2375.380947*		910	252	2423.954666	672	−520	−259
22	–				2424.926932	672	−124	117
23	–				–			
24	–				2426.848977	684	55	250
25	–				2427.798644	684	−257	−89
26	–				2428.741110*		−455	−317
27	2367.566313*		−784	−905	2429.675988*		−919	−815
28	2366.240933	852	140	200	–			
29	–				–			
30	2363.567464	888	−116	417	2432.439135	696	233	200
31	–				2433.343881*		−978	−1073
32	2360.865468*		−1500	−320	2434.243752	720	308	140
33	–				2435.133542*		−1105	−1360
34	–				2436.018624	744	167	−192

Tabelle A.31 $D^{12}CP$ $(120)^{2f} \leftarrow (020)^{2f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	2397.312083	71	−328	−219	2405.224426	99	415	91
4	–				2406.325807	106	106	−252
5	2394.988071	92	−31	247	2407.420209	118	−10	−393
6	–				2408.507854	135	301	−99
7	–				2409.587688	147	0	−410
8	–				2410.661097	169	485	73
9	2390.254691	162	−247	378	2411.726364*		52	−353
10	2389.053995	190	−101	605	2412.785317	206	544	152
11	2387.845987	218	−268	515	–			
12	2386.631000	250	−423	429	–			
13	2385.408923*		−689	224	2415.917529*		940	631
14	–				2416.947346*		1388	1118
15	2382.943943*		−1147	−146	–			
16	2381.701150*		−1247	−223	–			
17	2380.451212*		−1551	−520	2419.991100*		947	819
18	2379.194571*		−1625	−606	–			
19	–				2421.982715	370	−158	−183
20	2376.660851*		−1446	−519	2422.968219	390	54	80
21	–				2423.946025	405	−33	43
22	2374.100267	824	−504	226	2424.916685	421	150	271
23	–				2425.878871*		−710	−549
24	–				2426.835462	447	281	476
25	–				2427.783356	454	40	260
26	2368.895349	1197	256	186	2428.723441	454	−531	−297
27	2367.576837	1302	332	−40	2429.656879	463	−253	−17
28	2366.251624*		560	−161	–			
29	–				2431.500657	465	−237	−43
30	–				–			
31	2362.233748	1770	53	−2033	–			

Tabelle A.32 $D^{12}CP$ $(210)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				4771.375792	3567	397	344
2	4766.865389*		−3343	−3420	4772.469418*		2867	2830
3	4765.703444*		−3171	−3244	4773.545019*		1540	1522
4	–				4774.606276	1770	111	115
5	–				4775.654250	1760	−346	−317
6	4762.135317	1823	−42	−79	4776.688721	1177	−37	18
7	4760.916318	1813	−354	−372	4777.708294	1177	−344	−260
8	4759.684137	1829	271	273	4778.714214	1166	−5	106
9	4758.436806	1224	−144	−120	4779.705403	1171	−85	54
10	4757.175905	1219	−29	19	4780.682266	1171	−164	1
11	4755.900930	1235	105	177	4781.644837	1166	−190	−3
12	4754.611561	1230	−69	25	4782.593098	1166	−166	39
13	–				4783.526999	875	−124	92
14	4751.990719	1245	−295	−164	–			
15	4750.659313	1256	−293	−150	4785.351469	1166	−172	39
16	4749.314203	1903	64	212	4786.242055	1166	−208	−18
17	4747.954598	1903	−19	123	4787.118079	1166	−357	−203
18	4746.581138	1935	91	217	4787.979996	1161	−142	−45
19	4745.193267	1924	−164	−70	4788.827670	1166	318	338
20	4743.791626	1966	−148	−102	4789.660211	1166	157	71
21	4742.375909	3917	−169	−193	4790.478257	1161	33	−188
22	4740.946674	4002	328	209	–			
23	4739.502474	3991	−104	−347	4792.071370	1749	492	−111
24	4738.045359	4070	582	183	4792.846051	1749	737	−125
25	4736.574011*		1071	474	4793.606372*		1249	75
26	4735.087773	415100	704	−133	4794.352097*		1818	272
27	4733.588386*		1226	96	4795.083227*		2471	485
28	4732.075269*		2058	577	4795.798870*		2344	−159
29	–				4796.500238*		2679	−427
30	4729.005545*		2367	−23	4797.187262*		3436	−370
31	4727.450416*		3333	367	4797.860178*		4883	269
32	4725.880280*		3354	−283	4798.517709*		5775	234
33	4724.297550*		4850	437	4799.160847*		7140	536
34	4722.699173*		4779	−529	4799.788262*		7682	−133
35	4721.088782*		6784	450	–			
36	4719.462308*		6809	−697	4800.999206*		9730	−1015

Tabelle A.33 $D^{12}CP$ $(210)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
4	4764.519757*		1110	1063	4774.621729	1770	−85	−59
5	4763.326402*		984	914	4775.673906	1760	391	410
6	4762.118956*		855	761	4776.711152	1765	156	165
7	4760.896628	1813	−77	−197	4777.734088	1177	−157	−159
8	4759.661740	1829	499	352	4778.743488	1166	241	227
9	4758.412004	1834	284	110	4779.737772	1171	−217	−245
10	4757.148244	1224	91	−108	4780.718486	880	27	−13
11	4755.870747	1235	198	−24	4781.684688	875	46	−5
12	4754.579411	1230	492	251	4782.636800	875	277	216
13	4753.273294	1251	23	−234	4783.574031	875	−59	−126
14	4751.953962	1245	347	79	4784.497305	869	−21	−93
15	4750.620201	1256	240	−33	4785.406387	1166	170	98
16	4749.272569	1903	252	−19	4786.300722	1166	−26	−94
17	4747.910745	1903	53	−207	4787.180799	1161	−104	−163
18	4746.534729	1935	−364	−606	4788.046751	1161	85	40
19	4745.145664	1924	135	−79	4788.898007	1166	−13	−39
20	4743.742156	1966	150	−27	–			
21	4742.324557	3917	25	−105	4790.557438	1161	4	31
22	4740.893018	4002	−96	−167	–			
23	4739.448077	3986	321	318	4792.158774	1749	−229	−131
24	4737.988457	4076	−8	68	4792.938012	1744	−36	101
25	4736.515066	407760	−179	−16	4793.701964	1738	−611	−433
26	4735.028711	415730	610	870	4794.452465	1738	−98	120
27	4733.527306	417190	269	634	4795.187059*		−931	−678
28	4732.011406	425010	−648	−174	4795.908756	3498	−79	204
29	4730.482719	4277	−436	150	4796.615016	3482	−58	244
30	4728.939941	4362	−401	298	4797.306328	3477	−355	−48
31	4727.382685*		−930	−121	4797.983920	3493	282	574
32	–				4798.645570	3498	−342	−91
33	4724.228550	2258	135	1137	4799.290994*		−2485	−2306

... *Fortsetzung auf der nächsten Seite*

Tabelle A.33 Fortsetzung von $D^{12}CP$ $(210)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
34	4722.630022	2321	84	1159	4799.924093*		−2218	−2150
35	4721.016116*		−1423	−299	–			
36	4719.389230*		−1982	−841	–			

Tabelle A.34 $D^{12}CP$ $(014)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
5	–				4832.541086	3514	−428	−94
6	–				4833.535117	3493	−462	−136
7	–				4834.509559	3487	−81	225
8	–				4835.463386	3514	−300	−24
9	–				–			
10	4813.926052	3503	652	−123	4837.311901	3482	214	403
11	–				4838.205177	3503	−443	−308
12	–				4839.079604	3509	111	187
13	4809.870039*		1088	92	4839.933046	3487	−249	−235
14	4808.477763	349320	519	−520	4840.768109*		1094	1045
15	4807.067058*		1280	220	–			
16	4805.635653*		1088	32	4842.373917	3503	−250	−417
17	4804.183483	349580	−135	−1157	4843.148279*		700	487
18	–				4843.901184	3493	317	68
19	–				4844.634247	3509	224	−42
20	–				–			
21	–				–			
22	–				4846.712438	3482	−166	−330
23	4795.064108	3493	−146	−18	–			
24	4793.474778*		−763	−225	4847.997670	3514	168	264
25	–				4848.610726*		1045	1350
26	–				–			
27	–				4849.772503*		−966	−36

Tabelle A.35 $D^{12}CP$ $(014)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
5	–				4832.564088*		−935	−879
6	–				–			
7	4817.788475*		263	1544	4834.543659	3487	551	501
8	4816.513029*		−1149	111	–			
9	–				–			
10	4813.905740*		−1700	−629	4837.361875	3482	−225	−312
11	–				4838.262651	3509	432	363
12	4811.222851	3498	292	917	–			
13	4809.851492	348340	643	929	4840.003450	3487	367	377
14	4808.459468	349380	−174	−321	4840.843507	3493	−301	−234
15	4807.049570	349060	615	−64	4841.665118	3514	402	534
16	4805.619562*		763	−561	4842.465290	3503	−508	−306
17	4804.171124*		1934	−157	4843.246696	3482	−349	−74
18	4802.702928*		2786	−205	–			
19	–				4844.749968	3514	−37	381
20	–				4845.472068	3503	365	846
21	–				4846.172628*		−908	−374
22	–				4846.854558*		−940	−368
23	–				4847.516108*		−1476	−883
24	–				–			
25	–				–			
26	–				–			
27	–				4849.966850	3487	−217	206
28	–				–			
29	–				4851.072297	3509	−149	−12
30	–				4851.595510	3503	222	154

B Tabellen zu $D^{13}CP$

Tabelle B.1 $D^{13}CP$ $(010)^{1e,f} \leftarrow (000)^{0e}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				–				519.438 367	212	65	59
1	–				518.345 219	173	8	−2	520.535 216	149	15	9
2	–				518.351 850	130	−14	−24	521.632 588	130	16	11
3	–				518.361 855	120	11	2	522.730 391	130	−12	−17
4	–				518.375 129	116	−20	−28	523.828 679	135	−4	−8
5	–				518.391 739	111	−39	−46	524.927 437	125	36	33
6	511.774 131	169	23	17	518.411 735	116	5	−2	–			
7	510.681 350	159	−15	−20	518.435 002	116	−1	−7	527.126 118	111	15	13
8	509.589 183	149	−4	−9	518.461 603	116	6	2	528.226 079	106	14	13
9	508.497 565	140	−22	−25	518.491 539	120	31	28	529.326 381	106	−38	−37
10	507.406 562	140	−10	−12	518.524 784	125	49	48	530.427 127	111	−24	−23
11	506.316 141	130	−12	−13	518.561 272	125	−2	−2	531.528 239	111	−13	−12
12	505.226 322	130	−18	−18	518.601 135	125	11	12	532.629 705	111	−4	−2
13	504.137 157	125	15	17	518.644 267	125	−14	−11	533.731 510	106	1	4
14	503.048 560	120	−9	−6	518.690 734	125	−7	−4	534.833 643	106	3	5
15	501.960 605	116	−25	−20	518.740 510	130	8	12	535.936 076	106	−14	−12
16	500.873 336	120	2	8	518.793 556	125	−4	2	537.038 849	106	1	3
17	499.786 681	120	−10	−2	518.849 923	120	13	19	538.141 911	106	12	14
18	498.700 720	125	10	20	518.909 665	125	116	124	539.245 259	101	28	28
19	497.615 393	130	−6	5	518.972 453	116	−18	−10	540.348 843	101	10	10
20	496.530 753	135	−14	−2	519.038 682	111	10	18	541.452 702	101	11	10
21	–				519.108 167	111	19	27	542.556 796	101	5	2
22	494.363 558	145	−19	−6	519.180 895	106	3	11	543.661 126	106	4	0
23	493.281 082	149	46	60	519.256 762	106	−137	−130	544.765 665	106	−5	−11
24	492.199 175	159	−34	−20	519.336 186	106	22	28	545.870 452	111	31	23
25	491.118 106	169	2	16	519.418 645	106	−36	−31	546.975 357	116	−6	−16
26	490.037 716	169	−14	0	519.504 465	116	22	26	548.080 472	116	−11	−21
27	488.958 097	173	3	16	519.593 358	120	−85	−84	549.185 769	116	3	−9
28	487.879 205	178	1	12	519.685 782	125	106	105	550.291 211	120	11	−1
29	486.801 071	178	1	11	519.781 109	125	−26	−28	551.396 796	130	26	13
30	485.723 644	188	−53	−45	519.879 850	130	39	35	552.502 472	135	9	−4
31	484.647 060	202	−35	−30	519.981 652	130	−46	−53	553.608 241	145	−24	−36
32	483.571 280	212	9	12	520.086 814	145	26	17	554.714 166	154	3	−6
33	482.496 161	236	−71	−72	520.195 063	149	−10	−21	555.820 130	173	−12	−18
34	–				520.306 529	149	−16	−29	556.926 134	202	−54	−55
35	480.348 623	304	83	75	520.421 226	154	30	16	–			
36	479.275 929	342	27	15	520.539 074	173	57	42	559.138 390	265	−37	−23
37	478.204 165	424	87	70	520.660 009	217	10	−6	560.244 642	145	52	77
38	477.132 956	487	−120	−143	520.784 187	289	54	38	561.350 711	337	−53	−14
39	476.063 283*		379	352	520.911 452	313	41	27	562.456 806	410	−129	−73
40	474.993 552	549	−15	−46	521.041 855	337	33	22	563.562 980	482	−107	−30
41	473.925 096	540	24	−13	521.175 398	381	41	35	564.669 088	487	−118	−17
42	–				521.311 987	467	−19	−18	565.775 196	785	−82	49
43	471.790 166*		−472	−517	521.451 728	410	−30	−21	566.881 135	703	−152	12
44	470.724 672	597	−40	−88	521.594 530	361	−75	−53	–			
45	469.659 695	554	40	−10	521.740 458	410	−75	−40	569.093 090	776	29	279
46	468.595 594	737	120	69	521.889 550	684	16	69	570.198 112*		−684	−380
47	–				–				571.304 600	593	190	555
48	–				522.196 667	588	−41	60	572.409 740	988	−147	287
49	–				522.354 404*		−454	−322	–			
50	–				522.514 221*		−1814		–			
51	–				522.680 537	1763	310		–			

Tabelle B.2 D^{13}CP $(020)^{0e} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	505.079930	511	−183	−244	–				–			
3	–				–				–			
4	502.904248	313	−148	−204	507.275178	403	−35		–			
5	501.821877	328	199	147	(507.278005)				–			
6	500.743030*		648	603	507.281266	350	−45		515.038691	463	−54	−53
7	499.666623	313	127	89	507.285196	334	90	−146	516.161958	419	184	197
8	498.593877	332	−130	−159	507.289414	345	50	73	517.288076	405	103	127
9	497.524833	347	−63	−84	507.294017	318	−34	66	518.417268	443	−27	6
10	496.459071	342	−70	−82	507.299085	329	−47	−159	519.549715	458	28	69
11	495.396657	347	−58	−62	507.304526	307	−40	−97	520.685093	458	0	47
12	–				507.310280	307	−29	40	521.823374	419	−78	−27
13	–				507.316257	302	−57	−8	522.964650	352	−49	2
14	492.229157	352	72	84	507.322652*		125	−61	–			
15	491.179685	308	57	70	507.328903	297	10	82	525.255558	265	−21	20
16	490.133468	318	163	175	507.335338	297	−15	6	526.405034	313	−28	1
17	489.090070	328	5	11	507.341799	302	−43	57	–			
18	488.049831	318	−23	−24	507.348259	307	−36	133	528.711846	453	135	130
19	487.012815	337	203	190	507.354668	307	30	91	529.868763	448	59	32
20	485.978343	376	67	39	507.360834	329	35	−33	531.027904	337	−119	−169
21	484.946833	410	52	8	507.366726	350	27	38	532.189725	361	154	82
22	483.918096	429	40	−21	507.372225	307	−32	−103	533.353156	390	−94	−186
23	482.891844	491	−183	−260	507.377332	360	−56	−4	534.519084	463	125	21
24	481.868560	511	−57	−147	507.382027	350	23	−124	535.686569	491	−22	−129
25	480.847683	491	−64	−158	507.385899	355	−115	−106	536.856237	482	198	106
26	479.829101	487	−231	−320	507.389168	350	−158	−107	538.027136	385	−57	−111
27	478.813311	559	25	−41	(507.391844)			−176	539.199956	487	16	34
28	477.799771	583	250	231	(507.393468)			99	540.374202	540	38	170
29	476.788075	588	130	192	–				541.549599	684	−149	154
30	475.778465	699	1	186	–				542.726526	959	−47	497
31	–				–				543.904774	1012	256	1130
32	473.765515	660	113	727	–				545.083990*		527	1842
33	–				–				546.263690*		405	2296
34	471.757111*		−2442	−1041	–				–			
35	–				–				548.625195	2438	126	3685
36	–				–				–			
37	468.758844*		−3699	−37	–				–			

Tabelle B.3 $D^{13}CP$ $(020)^{2e} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				521.963978	593	−161	−25
2	–				–				523.070400	385	152	279
3	–				–				524.179530	332	−51	64
4	515.395179	670	−299	−163	519.765612	443	−73	−35	–			
5	514.311787	525	−364	−237	519.767730	414	−44	−5	526.407937	323	−7	79
6	513.232385	434	234	350	519.770398	304	76	116	527.526941	357	−50	19
7	512.155324	395	−183	−79	519.773289	342	−63	−24	528.649305	390	5	56
8	511.082499	448	247	338	519.776741	308	−149	−112	529.775005	381	116	148
9	510.012082	607	−340	−263	–				530.903791	347	11	25
10	508.946202	583	145	207	519.785595	299	−23	6	532.035886	347	−113	−117
11	507.883148	463	−53	−4	519.790787	284	−91	−70	533.171564	337	−11	−30
12	506.823677	390	−223	−186	519.796712	270	−79	−67	534.310420	347	−119	−153
13	505.767710*		−496	−470	519.803342	279	−59	−59	535.452847	328	−82	−128
14	504.716145	318	−27	−10	–				–			
15	503.667817	337	−41	−28	519.818879	289	−32	−63	537.748228	299	81	23
16	502.623274	352	−49	−37	519.828100	289	179	131	538.901118	381	54	−6
17	–				519.837895	279	50	−17	540.057590	241	4	−52
18	500.545875	347	19	40	519.849208*		461	374	541.217829	448	64	14
19	499.512953	332	−111	−78	519.860704	284	11	−95	542.381757	501	98	59
20	498.484157	313	−174	−125	519.873808	294	54	−70	–			
21	–				519.887985	275	−17	−157	–			
22	496.439493	400	134	225	519.903535	304	20	−131	–			
23	495.423062	429	−223	−108	519.920393	318	22	−136	547.075707	607	98	105
24	494.411686	443	85	222	–				548.259043	588	20	26
25	493.404391	400	−6	149	519.958425	342	−22	−174	–			
26	492.401575	366	−189	−25	–				550.638570*		302	258
27	491.403925	381	127	286	520.002956	395	38	−78	551.834251	901	0	−108
28	490.410872	410	277	411	520.027844	458	66	−19	553.034562	1446	−16	−227
29	489.422102	443	−153	−73	–				554.239503	1879	172	−193
30	488.438615	463	−263	−276	520.083283	506	66	69	–			
31	487.460301	501	−264	−422	520.114095	347	107	163	–			
32	486.487696	631	275	−93	520.146987	472	64	176	557.881083	1792	120	−1170
33	–				520.182011	650	−111	56	–			
34	–				520.219598	593	−85	130	–			
35	483.599921	564	−118	−1703	520.259565	597	−140	108	–			
36	–				520.301978*		−309	−52	–			
37	481.704284*		1407	−1722	520.346941*		−587	−354	–			
38	–				–				–			
39	–				520.446427	400	53	78	–			

Tabelle B.4 $D^{13}CP$ $(020)^{2f} \leftarrow (010)^{1e,f}$

	P-Zweig				Q-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				–				521.961376	641	74	49
2	517.563112*		−402	−407	–				523.061586	438	−141	−171
3	–				519.781109	125	89	38	524.162358	332	−164	−197
4	515.366720*		−404	−397	519.794462*		500	452	525.263654	222	−20	−57
5	514.269453	313	−139	−126	519.810483*		344	300	526.365354	125	182	141
6	513.172526	419	9	28	–				–			
7	512.075729	366	−181	−156	519.852138	323	−52	−85	528.569162	385	1	−45
8	510.979757	395	−24	8	–				–			
9	509.884006	453	−133	−96	519.907040	308	−120	−140	530.774316	323	−79	−129
10	508.788975	520	−22	21	519.939160*		−324	−339	531.877377	318	−72	−125
11	507.694134	467	−229	−181	519.974943	279	−89	−99	532.980948	251	169	115
12	506.600175	328	−73	−20	520.013811	275	10	5	534.084336	347	−37	−92
13	505.506550	328	−113	−55	520.055675	255	−113	−114	535.188195	357	−24	−80
14	504.413710	448	94	155	520.100952	255	−39	−36	536.292328	352	24	−32
15	503.321484*		366	430	520.149511	231	106	111	–			
16	502.229245	385	66	132	520.201092	255	64	70	538.501092	405	−51	−107
17	501.137765	400	−43	24	520.255864	260	9	14	539.605853	400	−19	−75
18	500.046991	410	−25	43	520.313918	255	35	38	540.710850	453	59	4
19	498.956734	371	−77	−10	520.375085	217	−23	−23	541.815978	549	91	36
20	497.867228	342	25	90	520.439496	241	−29	−33	542.921210	665	63	9
21	496.778102	342	−99	−39	520.507176	251	47	36	544.026559	376	−1	−54
22	495.689709	361	−106	−52	520.577995	279	78	62	545.132197	463	85	34
23	494.601838	357	−216	−169	520.651861	347	−21	−44	–			
24	493.515177	395	250	288	520.729114	443	95	64	547.343642	655	62	14
25	492.428398	361	−44	−19	520.809323	554	0	−38	548.449541	805	70	25
26	491.343078*		468	479	–				549.555584	1074	134	93
27	490.257620	381	181	176	520.979406	622	−3	−49	–			
28	489.172660	414	−277	−302	521.069123	443	−56	−101	–			
29	488.089340	429	226	180	521.162097	491	6	−35	552.873830	602	55	26
30	487.005661*		−316	−387	–				553.980069	626	100	76
31	485.923545	525	9	−91	521.357133	742	−184	−195	555.086204	660	21	3
32	484.841998	607	199	68	–				556.192312	679	−93	−103
33	483.760784	607	9	−156	521.564986	448	−44	12	557.298655	679	34	33
34	482.681231*		760	557	521.673471	424	−80	30	558.404908	766	92	101
35	–				521.785133	597	−39	142	559.510885	1017	−92	−72
36	–				521.899646	1065	−239	33	560.616706*		−385	−351
37	–				522.017220*		−461	−74	–			
38	–				522.137972*		−581	−52	–			

Tabelle B.5 D^{13}CP $(002)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	2420.624 212*		−752	−824	–			
3	2419.512 749	828	48	−25	–			
4	2418.392 480	792	194	119	2428.182 167*		532	471
5	2417.263 736	780	2	−74	2429.228 158	624	−157	−218
6	2416.126 904	792	−156	−233	2430.266 671	600	−95	−154
7	2414.982 485	780	206	127	2431.296 986	600	1	−56
8	–				2432.319 270	516	303	247
9	2412.669 440*		972	892	2433.332 636	588	−78	−131
10	2411.499 209	756	−265	−345	2434.337 971	576	−251	−303
11	2410.322 884*		436	356	2435.335 495	564	1	−49
12	2409.137 863*		452	373	–			
13	2407.944 313	816	−71	−149	2437.305 674	576	338	295
14	2406.743 450	816	58	−18	–			
15	2405.534 279	840	−178	−252	2439.242 120	564	−143	−177
16	2404.317 742	816	136	66	2440.198 379	588	−17	−46
17	–				–			
18	2401.860 516	948	259	197	2442.085 915	612	−118	−135
19	2400.619 772	996	−44	−100	2443.017 691	636	137	127
20	2399.371 330	1020	−239	−288	2443.941 325*		436	433
21	2398.115 354	1080	−191	−233	2444.855 598*		−451	−446
22	2396.851 624	1140	−152	−187	–			
23	2395.580 249	1200	−46	−72	2446.661 987	720	96	118
24	2394.301 453	1272	320	301	2447.552 719	756	120	150
25	2393.014 514	1140	188	178	2448.435 142	768	−42	−5
26	2391.720 097	1440	189	186	2449.309 423	828	−239	−195
27	2390.417 981	1536	66	70	2450.175 783	840	−266	−216
28	–				2451.034 500	876	137	192
29	–				–			
30	2386.467 045	1836	184	200	2452.726 785	900	−59	−4
31	2385.134 796	1944	−151	−137	2453.561 240	996	189	239
32	2383.795 403	2292	−249	−241	2454.387 941*		677	718
33	–				2455.204 782*		−721	−696
34	2381.095 567*		481	462	2456.016 860*		1067	1069
35	–				–			
36	–				2457.613 708*		1090	1019
37	–				2458.399 198	1092	−5	−129
38	–				–			
39	–				2459.948 521*		−328	−604

Tabelle B.6 D^{13}CP $(100)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				2389.556 440*		−1172	−1183
1	–				–			
2	2386.270 243	2280	393	414	2391.705 142*		576	534
3	2385.156 122	2208	104	131	2392.764 537	1644	−3	−62
4	2384.032 861	1956	−386	−356	2393.815 347	816	−147	−223
5	–				2394.857 516	1344	103	10
6	2381.760 916	1548	−3	26	2395.890 158	1320	−123	−232
7	–				2396.914 602*		520	397
8	2379.452 856	1212	−68	−48	2397.928 966	1152	167	33
9	2378.286 004*		439	451	2398.934 300	1116	−114	−255
10	2377.109 291	1212	−14	−11	–			
11	2375.924 105	540	−44	−49	2400.918 271	996	7	−132
12	–				–			
13	2373.527 310	444	156	134	–			
14	2372.315 258	708	−61	−89	2403.825 432	972	148	74
15	–				2404.775 820	960	−50	−80
16	2369.865 067	852	89	57	2405.717 234	888	27	55
17	2368.626 373	864	−97	−124	2406.649 121	948	−151	−49
18	–				2407.572 090	876	50	244
19	2366.122 453	804	−319	−317	2408.484 978*		−507	−201
20	–				2409.389 612	948	32	472
21	2363.582 391*		−1085	−1017	2410.283 723*		−577	23
22	2362.300 493	504	26	144	2411.168 584*		−1032	−246
23	2361.007 821*		−724	−542	2412.044 416*		−1083	−81
24	2359.707 727	600	24	286	–			

Anhang K

Linienlisten von HBS

A Tabellen zu $H^{11}B^{32}S$

Tabelle A.1 $H^{11}B^{32}S$ $(001)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				1173.635 856	35	−44	−46
1	1171.096 539	35	−49	−49	1174.895 274	27	2	0
2	1169.816 681	27	−1	0	1176.147 757	25	−7	−10
3	1168.529 950	25	−17	−15	1177.393 361	25	3	−1
4	1167.236 439	25	−20	−18	1178.632 040	25	3	−2
5	1165.936 167	25	−10	−7	1179.863 820	25	37	32
6	1164.629 115	27	−21	−17	1181.088 601	27	24	18
7	1163.315 348	27	−6	−2	1182.306 430	27	28	21
8	1161.994 848	27	−1	4	1183.517 248	27	8	1
9	1160.667 667	27	30	36	1184.721 080	27	8	0
10	1159.333 685	27	−49	−43	1185.917 901	27	21	13
11	1157.993 142	29	−16	−9	1187.107 674	29	28	20
12	1156.645 937	29	11	19	1188.290 348	29	−2	−12
13	1155.292 066	29	13	21	1189.465 995	29	19	10
14	1153.931 548	29	−9	0	1190.634 527	29	24	14
15	1152.564 462	27	9	18	1191.795 933	29	19	9
16	1151.190 726	29	−33	−23	1192.950 206	27	17	7
17	1149.810 472	27	−18	−8	1194.097 320	27	10	0
18	1148.423 655	27	−8	3	1195.237 259	27	2	−8
19	1147.030 312	27	19	29	1196.370 036	27	23	13
20	1145.630 375	27	−23	−12	1197.495 577	25	20	10
21	1144.223 987	27	−6	5	1198.613 882	25	11	2
22	1142.811 092	27	−1	10	1199.724 928	25	−7	−16
23	1141.391 712	27	−3	8	1200.828 739	25	8	0
24	1139.965 854	27	−21	−10	1201.925 247	25	9	1
25	1138.533 594	25	6	16	1203.014 441	25	2	−5
26	1137.094 843	27	−27	−17	1204.096 312	25	0	−7
27	1135.649 752	27	15	25	1205.170 857	25	17	12
28	1134.198 205	27	1	10	1206.237 992	27	−9	−14
29	1132.740 296	27	10	18	1207.297 774	27	−4	−7
30	1131.275 944	27	−56	−49	1208.350 105	29	−44	−47
31	1129.805 295	29	−66	−60	1209.395 067	31	−30	−31
32	1128.328 344	31	−39	−35	1210.432 587	33	−12	−12
33	1126.845 056	31	−27	−24	1211.462 683	35	44	46
34	1125.355 556	33	80	81	1212.485 230	40	36	39
35	1123.859 622	38	45	45	1213.500 203	42	−43	−39
36	1122.357 433	40	33	30	1214.507 788	48	13	19
37	1120.848 994	42	31	26	1215.507 677	50	−84	−76
38	1119.334 284	48	5	−2	1216.500 266	56	83	91
39	1117.813 356	50	−7	−17	1217.485 016	62	−8	3
40	1116.286 275	58	44	30	1218.462 339	67	78	90
41	1114.752 888	62	−11	−28	1219.431 890	75	14	27
42	1113.213 402	65	22	1	1220.393 855	79	7	21
43	1111.667 700	71	9	−16	1221.348 192	83	33	50
44	1110.115 350*		−495	−525	1222.294 704	96	−82	−65
45	1108.558 157*		298	263	1223.233 515*		−197	−178
46	1106.993 706	81	−41	−82	1224.165 652*		736	756
47	1105.423 320*		−205	−251	1225.087 514*		−863	−843
48	–				1226.004 235*		158	179
49	–				1226.912 390*		395	417
50	–				1227.812 048	108	−63	−42

Tabelle A.2 $H^{11}B^{32}S$ $(002)^{0e} \leftarrow (001)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
3	–				1167.761733	121	211	
4	–				1168.993417	110	178	74
5	–			−198	1170.218187	110	187	5
6	1155.065096*		−537	617	1171.435387*		−402	−17
7	1153.758802*		243	57	1172.646774	121	186	−630
8	1152.444397	98	−344	1341	1173.849901*		−480	−61
9	1151.125121*		924	456	1175.047554	102	403	−740
10	1149.796979*		33	148	1176.237062	110	181	138
11	1148.462739	90	−266	777	1177.419770	110	215	−83
12	1147.122781*		387	73	1178.594953*		−203	−41
13	1145.774855	81	−275	59	1179.763783	110	116	−443
14	1144.421004	77	−229	−167	1180.925890*		818	−103
15	1143.060349	75	−371	686	1182.079697	108	343	627
16	1141.694202*		591	−106	1183.226535	108	37	185
17	1140.319858	67	−66	102	1184.367583*		1096	−82
18	1138.939986	65	308	−1161	1185.498436*		−869	1021
19	1137.552135*		−757	258	1186.625897*		961	−897
20	1136.160481*		896		1187.742945*		−418	984
21	–				1188.855480*		908	−342
22	–				1189.958356	117	−190	1039

Tabelle A.3 $H^{11}B^{32}S$ $(011)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
2	–			156	1165.470036	110	71	192
3	1164.174511	102	209	102	1164.183487	102	21	16
4	1162.878171	96	8	69	1162.890286	96	−6	−148
5	1161.575483	90	71	−472	1161.589922*		−538	208
6	1160.266171	85	105	−114	1160.283817	85	−171	65
7	1158.950174	79	32	2	1158.970849	79	−44	85
8	1157.627595	75	−61	−171	1157.650985	79	−206	−58
9	1156.298646	71	21	−88	1156.324788	75	−111	−2
10	1154.963063	71	−3	−86	1154.991936	71	−97	25
11	1153.620916	73	−78	−165	1153.652446	73	−165	−21
12	1152.272514	69	87	−36	1152.306623	67	−26	−58
13	1150.917369	69	−10	−221	1150.953960	69	−203	−53
14	1149.555722	65	−146	194	1149.595387	65	218	69
15	1148.187898	67	−10	53	1148.229765	62	82	−83
16	1146.813420	65	−95	−32	1146.857719	65	−2	−73
17	1145.432753	62	49	122	1145.479450	62	151	24
18	1144.045415	60	−76	−46	1144.094412	60	−20	36
19	1142.652011	58	120	82	1142.703238	58	101	−121
20	1141.251888	56	−30	39	1141.305478	56	49	151
21	1139.845687	56	100	151	1139.901473	54	151	−111
22	1138.432887	54	−26	23	1138.490843	54	10	300
23	1137.013783	54	−127	−77	1137.073875	52	−100	149
24	1135.588684	52	91		–			−130
25	1134.156799	52	−176	−66	1134.221111	52	−107	−67
26	1132.719289	52	219	−42	1132.785263	52	−84	186
27	–			525	1131.343657*		489	60
28	1129.824887*		432	−11	1129.894665	50	−30	−67
29	1128.367367*		−405	445	1128.440401*		459	−448
30	1126.904807	54	−50	29	1126.979018	54	94	471
31	1125.436169*		447	−528	1125.511267*		−388	433
32	1123.960960*		580	−813	1124.037580*		−569	−954
33	–			191	1122.558995*		575	−567
34	1120.990993*		−135	−919	1121.072128*		−353	
35	–				–			
36	–				–			
37	–			−1033	1116.577964*		418	

Tabelle A.4 $H^{11}B^{32}S$ $(011)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				1170.548 896	110	32	
2	1165.470 036	110	71		1171.801 845	102	118	−308
3	1164.183 487	102	21	185	1173.047 759	96	−50	−130
4	1162.890 286	96	−6	−15	1174.286 888	88	−204	−330
5	1161.589 922*		−538	50	1175.519 721	83	163	95
6	1160.283 817	85	−171	86	1176.745 221	77	32	−32
7	1158.970 849	79	−44	16	1177.964 030	73	63	88
8	1157.650 985	79	−206	−75	1179.175 805	75	−68	−33
9	1156.324 788	75	−111	9	1180.380 887	71	0	68
10	1154.991 936	71	−97	−12	1181.579 029	75	36	−259
11	1153.652 446	73	−165	−85	1182.770 168	71	−2	87
12	1152.306 623	67	−26	83	1183.954 368	71	−31	−25
13	1150.953 960	69	−203	−13	1185.131 640	71	−23	22
14	1149.595 387	65	218	−146	1186.302 041	75	101	100
15	1148.229 765	62	82	−8	1187.465 161	75	−52	113
16	1146.857 719	65	−2	−91	1188.621 415	73	−46	−198
17	1145.479 450	62	151	54	1189.770 709	73	44	69
18	1144.094 412	60	−20	−69	1190.912 852	77	47	−35
19	1142.703 238	58	101	128	1192.047 741	77	−120	19
20	1141.305 478	56	49	−21	1193.175 954	81	140	188
21	1139.901 473	54	151	109	1194.296 510	81	−134	429
22	1138.490 843	54	10	−18	1195.410 596*		266	−52
23	1137.073 875	52	−100	−120	1196.516 959	88	108	−246
24	–			97	1197.616 016	88	−172	118
25	1134.221 111	52	−107	−172	1198.708 217	94	−104	88
26	1132.785 263	52	−84	220	1199.793 394	100	167	−208
27	1131.343 657*		489		1200.870 960	100	72	−1
28	1129.894 665	50	−30	424	1201.941 277	100	−4	−534
29	1128.440 401*		459	−419	1203.004 075*		−310	175
30	1126.979 018	54	94	−70	1204.060 893*		712	−42
31	1125.511 267*		−388	419	1205.109 459*		813	288
32	1124.037 580*		−569	542	1206.149 366*		−392	
33	1122.558 995*		575		1207.183 725*		227	−489
34	1121.072 128*		−353	−196	–			
35	–				–			−57
36	–				–			
37	1116.577 964*		418		–			66

Tabelle A.5 $H^{11}B^{32}S$ $(100)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				2737.065 644*		421	421
1	2734.525 458*		452	445	2738.326 550	272	146	149
2	2733.246 445*		440	430	2739.581 733	233	122	129
3	2731.960 688*		−411	−425	2740.830 724	180	−102	−91
4	2730.670 405	185	98	82	2742.073 178*		−855	−839
5	2729.373 503	175	−142	−161	2743.311 943*		729	749
6	2728.070 414*		−718	−740	2744.542 313	146	−40	−15
7	2726.762 544	131	−242	−267	2745.767 297	136	−136	−106
8	2725.448 782	126	157	128	2746.986 642	131	204	239
9	2724.128 700	121	32	0	2748.199 057	131	−294	−253
10	2722.802 775	121	−157	−193	2749.406 239	121	84	130
11	2721.471 549	121	112	72	2750.606 672	121	−164	−112
12	2720.134 420	117	219	175	2751.801 485	117	110	166
13	2718.791 801*		558	509	2752.989 604	117	−155	−93
14	2717.442 111*		−471	−526	2754.172 207	126	236	304
15	2716.088 351	112	115	53	2755.347 971	121	−24	49
16	2714.728 115	121	−111	−181	2756.517 612	121	−203	−126
17	2713.362 843	126	272	194	2757.681 447	131	30	112
18	2711.991 606	131	317	229	2758.838 491	146	−293	−208
19	2710.614 496	136	95	−3	2759.989 505	146	−398	−309
20	2709.231 748	131	−177	−288	2761.134 798	155	41	133
21	2707.844 271	155	388	263	2762.273 031	175	−300	−207
22	2706.450 090	165	−203	−344	2763.406 044*		432	527
23	2705.050 953*		−223	−381	2764.531 578	180	−5	89
24	2703.647 127*		576	397	–			
25	2702.235 919*		−521	−722	2766.764 834	228	293	384
26	2700.821 208	228	346	120	2767.871 994*		496	582
27	2699.400 915*		1076	824	2768.972 082	282	−7	74
28	–				2770.066 072	340	−228	−153
29	2696.541 823	301	287	−29	2771.153 938	340	−177	−112
30	2695.104 275*		−23	−375	–			
31	2693.662 572*		874	482	–			
32	2692.214 426*		670	235	–			
33	–				2775.443 186*		2032	2039
34	2689.304 105*		2174	1639	2776.499 389*		2599	2585
35	2687.839 420*		1328	737	–			
36	2686.372 077*		3081	2429	–			
37	2684.897 057*		2391	1674	–			
38	2683.417 166*		2042	1255	–			
39	2681.932 433*		2043	1179	–			
40	–				–			
41	2678.948 717*		3277	2243	–			

B Tabellen zu $H^{10}B^{32}S$

Tabelle B.6 $H^{10}B^{32}S$ $(001)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				1208.400 257	71	−19	−21
1	1205.728 319	65	−1	0	1209.725 357	48	5	1
2	1204.381 390	48	−87	−85	1211.043 140	40	6	1
3	1203.027 360	42	−58	−54	1212.353 616	35	14	8
4	1201.666 157	35	−3	1	1213.656 743	33	7	0
5	1200.297 721	33	−2	4	1214.952 560	31	43	35
6	1198.922 101	31	−25	−17	1216.240 963	29	39	30
7	1197.539 351	29	−35	−27	1217.521 965	27	28	17
8	1196.149 518	29	−5	5	1218.795 570	27	33	22
9	1194.752 492	29	−61	−51	1220.061 682	27	−19	−31
10	1193.348 483	27	−14	−2	1221.320 449	27	38	25
11	1191.937 338	27	−33	−20	1222.571 670	27	25	12
12	1190.519 145	27	−49	−35	1223.815 421	27	39	25
13	1189.093 982	27	0	14	1225.051 629	27	28	14
14	1187.661 770	27	16	30	1226.280 338	27	56	42
15	1186.222 531	29	3	18	1227.501 436	27	34	20
16	1184.776 337	29	17	33	1228.714 932	27	−9	−23
17	1183.323 162	29	15	31	1229.920 873	27	−3	−17
18	1181.863 001	29	−26	−10	1231.119 160	29	−27	−41
19	1180.395 935	31	−41	−26	1232.309 821	29	−30	−43
20	1178.922 026	31	15	29	1233.492 889	31	42	30
21	1177.441 091	33	−59	−44	1234.668 132	31	−19	−30
22	1175.953 367	33	−40	−27	1235.835 717	31	−26	−36
23	1174.458 789	35	−11	1	1236.995 605	33	5	−3
24	1172.957 388	38	43	54	1238.147 690	35	−8	−15
25	1171.449 091	40	34	43	1239.292 041	38	25	20
26	1169.933 931	42	−23	−15	1240.428 574	42	43	40
27	1168.412 043	46	−6	−1	1241.557 160	42	−60	−60
28	1166.883 448	50	88	91	1242.678 071	46	12	15
29	1165.347 883	54	−19	−18	1243.791 035	50	10	15
30	1163.805 696	56	7	5	1244.896 058	54	−38	−30
31	1162.256 690	65	−48	−53	1245.993 239	60	−9	3
32	1160.701 019	67	−44	−53	1247.082 507	62	51	67
33	1159.138 606	75	−73	−86	1248.163 791	71	93	113
34	1157.569 664	75	63	46	1249.236 895	71	−54	−30
35	–				1250.302 069	79	−116	−88
36	1154.411 449	85	27	0	1251.359 418	83	35	69
37	1152.822 558*		208	176	1252.408 765*		248	287
38	1151.226 532*		−110	−148	1253.450 025*		461	506
39	1149.624 964*		652	608	1254.483 375*		876	927
40	1148.014 934*		−439	−490	1255.507 506*		210	267
41	1146.400 682*		841	783	1256.524 602*		670	733
42	1144.777 770	81	42	−24	1257.532 324*		−58	13
43	1143.149 628*		579	506	1258.532 027*		−592	−514

Tabelle B.7 $H^{10}B^{32}S$ $(011)^{1f} \leftarrow (010)^{1f}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
5	1194.953 112*		−689	−591	1209.651 929*		828	206
6	1193.575 571*		−506	−77	1210.944 902	100	−201	513
7	1192.191 204	117	−296	226	1212.231 988	85	−8	147
8	1190.800 081	108	−6	69	1213.511 842	104	85	−266
9	1189.401 822	102	−33	−305	1214.784 451	96	85	−12
10	1187.997 514*		693		1216.049 754	102	−46	−253
11	1186.584 733	108	−269	−1032	1217.308 256	100	220	−5
12	1185.166 152	110	−262	326	1218.559 577*		526	191
13	1183.740 511*		−562	−548	1219.802 759	100	−63	−1272
14	–			78	1221.039 336	102	11	76
15	1180.869 945	110	−251	−278	1222.268 001*		−535	−130
16	1179.423 949*		−742	−612	1223.490 194	102	−238	665
17	1177.972 417	108	−77	243	1224.704 352*		−636	226
18	1176.513 878*		258	13	1225.912 198	108	18	−171
19	–			81	1227.111 302*		−679	−1932
20	1173.575 930	119	33	−73	1228.304 151	106	−216	−1629
21	1172.096 242*		−835		1229.489 603*		291	−1774
22	1170.611 213*		−422		1230.666 612	106	−178	−820
23	1169.119 773	121	189	592	1231.834 841*		−1935	
24	–			−69	–			
25	1166.116 119	131	412		1234.154 028	104	−133	
26	–				1235.301 755	106	248	
27	–			21	1236.441 324	115	73	

Tabelle B.8 $H^{10}B^{32}S$ $(011)^{1e} \leftarrow (010)^{1e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
4	1196.337 655*		−8	−655	–			
5	1194.969 915*		73	−591	1209.629 258	108	320	206
6	1193.595 656*		594	−77	1210.919 507*		570	513
7	1192.214 234*		894	226	1212.201 894	104	155	147
8	1190.825 418*		724	69	1213.477 025	104	−297	−266
9	1189.429 467	110	326	−305	1214.745 595	104	−68	−12
10	–				1216.006 424	102	−317	−253
11	1186.616 902*		−478	−1032	1217.260 475	102	−58	−5
12	1185.202 035*		829	326	1218.507 188	100	173	191
13	1183.778 086*		−105	−548	1219.744 936*		−1229	−1272
14	1182.348 806	100	455	78	1220.978 171	100	211	76
15	1180.911 728	110	27	−278	1222.202 507	102	133	−130
16	1179.467 873*		−383	−612	1223.420 478*		1093	665
17	1178.018 426	108	394	243	1224.629 831*		864	226
18	1176.561 127	119	85	13	1225.831 822*		726	−171
19	1175.097 378	110	77	81	1227.025 022*		−725	−1932
20	1173.626 672	110	−151	−73	1228.212 842*		−53	−1629
21	–				1229.392 747*		234	−1774
22	–				1230.566 265*		1688	−820
23	1169.175 445*		341	592	–			
24	1167.677 459	121	−353	−69	–			
25	–				–			
26	–				–			
27	1163.145 713	121	−241	21	–			

Tabelle B.9 $H^{10}B^{32}S$ $(100)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				2754.090 909*		−533	−637
2	2748.747 848*		1284	1327	2755.411 987*		1260	1113
3	–				–			
4	–				2758.029 023	360	180	−55
5	2744.666 917	505	−405	−279	2759.327 073*		−564	−844
6	–				–			
7	2741.915 829*		1323	1489	2761.904 690	364	92	−278
8	–			201	–			
9	–			558	–			−143
10	–			58	–			−565
11	–			−413	–			496
12	2734.917 810*		831	1040	–			−199
13	2733.497 690	369	−144	65	–			
14	2732.072 778*		590	797	–			530
15	–			367	2771.935 798*		1096	462
16	2729.200 626*		−849	−652	2773.157 325	345	412	−232
17	–				2774.373 514*		1463	817
18	2726.304 815	360	−184	−2	2775.579 921*		−177	−815
19	2724.847 687*		536	710	–			
20	2723.381 991*		−931	−766	2777.974 422*		−422	−1016
21	2721.912 031	403	−302	−145	–			
22	2720.435 488	705	83	234	2780.340 871	389	−137	−636
23	2718.951 121*		−1036	−890	–			
24	–				–			
25	2715.967 023	554	239	382	2783.837 698*		1352	1106
26	2714.463 536*		−1165	−1017	2784.987 319	899	307	180
27	2712.955 775*		−604	−447	–			
28	2711.441 861	685	20	191	2787.266 744	899	178	350
29	–				2788.396 228*		809	1163
30	–				2789.516 722	914	−244	317
31	–				2790.631 600*		410	1203

C Tabelle zu $H^{11}B^{34}S$

Tabelle C.10 $H^{11}B^{34}S$ $(001)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				1165.599843	102	48	48
2	–				1166.833176	90	−102	−102
3	–				1168.060007	83	0	−1
4	1158.057980	79	−62	−62	1169.279892	79	−75	−76
5	1156.777740	77	−26	−25	1170.493217	71	78	77
6	1155.490944	69	73	73	1171.699382	67	−125	−126
7	1154.197432	65	56	56	1172.899045	65	−7	−8
8	1152.897267	58	−30	−29	1174.091808	65	51	49
9	1151.590711	58	61	62	1175.277617	65	11	10
10	1150.277418	58	−33	−32	1176.456652	60	73	71
11	1148.957682	58	−36	−35	1177.628568	60	−92	−94
12	1147.631376	56	−90	−89	1178.793900	60	69	68
13	1146.298775	52	63	65	1179.952088	58	15	13
14	1144.959446	52	−25	−24	1181.103369	60	−1	−3
15	1143.613791	52	31	32	1182.247685	60	−18	−20
16	1142.261460	52	−136	−134	1183.385072	60	18	16
17	1140.902968	50	−25	−24	1184.515458	62	53	51
18	1139.538032	48	64	65	1185.638746	62	8	6
19	1138.166697	48	160	161	1186.755006	67	−29	−31
20	1136.788782	48	66	67	1187.864341	67	63	62
21	1135.404424	48	−96	−95	1188.966455	69	8	6
22	1134.013982	48	17	18	1190.061581	69	55	53
23	1132.616912	48	−155	−154	1191.149555	73	60	59
24	1131.214018	48	177	178	1192.230167	81	−169	−170
25	1129.805295*		993	994	1193.303845	81	−185	−186
26	1128.388396	50	−71	−70	1194.370132*		−427	−428
27	1126.966171	50	−179	−178	1195.429773	94	−131	−132
28	1125.538145	52	179	179	1196.481760*		−286	−287
29	1124.103189	54	−143	−143	1197.527018	102	52	51
30	1122.662711*		249	249	1198.564799	102	152	152
31	1121.215520	60	149	149	1199.594438*		−629	−629
32	1119.761006*		−1068	−1068	1200.618311	110	102	103
33	1118.302572	67	−14	−15	1201.634467*		413	414
34	1116.836635*		−288	−288	1202.642940*		358	360
35	1115.364670*		−428	−429	1203.643973*		199	202
36	1113.887142	77	15	14	1204.637074*		−536	−533
37	1112.403715*		690	689	–			
38	1110.912784	81	−21	−23	1206.603106	110	−35	−30

D Tabelle zu $H^{10}B^{34}S$

Tabelle D.11 $H^{10}B^{34}S$ $(001)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
0	–				1199.494243	121	−314	−318
1	–				–			
2	–				1202.099809	100	19	13
3	1194.197379*		−1189	−1188	1203.391728	102	78	71
4	1192.856931	110	68	70	1204.676113	104	−200	−208
5	1191.508143	102	32	36	1205.954219	104	458	450
6	1190.152053	100	−277	−272	1207.224038	102	65	56
7	1188.789173	108	−366	−359	1208.487007	102	77	68
8	1187.419766	102	11	19	1209.742526	94	−86	−96
9	1186.042721	102	−275	−266	1210.991094	94	94	85
10	1184.659643	100	363	373	–			
11	1183.268625	94	1	11	1213.466023	90	212	204
12	1181.871041	102	−5	7	1214.692134	92	−60	−68
13	1180.466798	102	236	248	1215.911340	96	139	132
14	1179.055058	100	−132	−120	1217.123019	96	208	201
15	1177.636932	100	−14	−2	1218.326716	94	−289	−295
16	1176.212161	102	313	325	1219.523828	94	67	62
17	1174.779642	102	−269	−259	1220.712813	94	−245	−249
18	1173.341039	108	−114	−105	1221.894593	92	−283	−286
19	1171.895747	102	157	164	1223.069192	92	0	−2
20	1170.443263	110	25	30	1224.235979	100	−6	−7
21	1168.984132	110	19	20	1225.395518	100	284	284
22	1167.518106	110	−125	−128	1226.547009	108	91	92
23	–				1227.690870	100	−143	−142
24	1164.566561	112	301	289	1228.827555	108	55	58
25	1163.079959	110	−242	−261	1229.956597	106	243	246
26	–				1231.077587	117	32	35
27	–				1232.190623	106	−457	−453
28	–				–			
29	–				1234.395259	115	249	252

E Tabelle zu $H^{11}B^{33}S$

Tabelle E.12 $H^{11}B^{33}S$ $(001)^{0e} \leftarrow (000)^{0e}$

	P-Zweig				R-Zweig			
J''	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}	$\tilde{\nu}_{obs}$	$\delta\tilde{\nu}$	Δ_{eff}	Δ_{ps}
1	–				1170.110119	58000	−290	−290
2	–				1171.352359*		−731	−731
3	1163.795709	58000	428	428	1172.589916*		966	966
4	1162.511754	58000	−277	−277	1173.819216*		1245	1245
5	1161.221959	54000	−121	−121	1175.039854	53000	−280	−280
6	1159.925277	53000	−167	−167	1176.255784	53000	360	360
7	1158.621201*		−939	−939	1177.463479	57000	−342	−342
8	1157.312457	49000	273	273	1178.665647	52000	339	339
9	1155.994142*		−1452	−1452	–			
10	1154.672254	47000	−131	−131	1181.047595	48000	116	116
11	1153.342269	46000	−304	−304	1182.228817*		689	689
12	1152.006048	46000	−128	−128	1183.402007	52000	213	213
13	1150.663482	45000	273	273	1184.568460	48000	0	0
14	1149.313788	41000	99	99	1185.727022*		−1085	−1085
15	1147.957517	41000	−114	−114	1186.880854	52000	138	138
16	1146.594907	39000	−145	−145	1188.026308	45000	39	39
17	1145.226253	38000	286	286	1189.164506	52000	−242	−242
18	1143.849584*		−808	−808	1190.295688	53000	−445	−445
19	1142.467741*		−601	−601	1191.420696	49000	290	290
20	1141.080110	32000	276	276	1192.537673	53000	124	124
21	1139.684602	32000	−281	−281	1193.647411	53000	−130	−130
22	1138.284307*		802	802	–			
23	1136.875703	29000	−10	−10	–			
24	–				1196.934094	54000	−333	−333
25	–				1198.016232*		604	604
26	–				1199.089387	53000	−196	−196
27	–				1200.156687	53000	414	414

Anhang L

Computer Programme

A MCFermi.f

```
      program eigenvalues
      real*8 ar(3,3),ai(3,3),w(3),zr(3,3),zi(3,3),fv1(3),fv2(3),fm1(2,3)
      real*8 cr(3,3),mina,minb,minc,res,min
      integer i,j,ierr
c
      min=10000d0
c
      cr(1,1)=2550.16d0
      cr(1,2)=16.346d0
      cr(1,3)=0d0
      cr(2,1)=16.346d0
      cr(2,2)=2604.48d0
      cr(2,3)=23.11673489d0
      cr(3,1)=0d0
      cr(3,2)=23.11673489d0
      cr(3,3)=2642.36d0
c
      do 1000 i=1,200000
c
      ar(1,1)=cr(1,1)+rand()*20
      ar(1,2)=cr(1,2)
      ar(1,3)=cr(1,3)
      ar(2,1)=cr(2,1)
      ar(2,2)=cr(2,2)+rand()*20
      ar(2,3)=cr(2,3)
      ar(3,1)=cr(3,1)
      ar(3,2)=cr(3,2)
      ar(3,3)=cr(3,3)+rand()*20
c
c
c
c
      call diag(3,3,ar,ai,w,0,zr,zi,fv1,fv2,fm1,ierr)
c
c     print*,w(1)
c     print*,w(2)
c     print*,w(3)
      res=(w(1)-2545.20942)**2+(w(2)-2598.0)**2+(w(3)-2654.02)**2
      if (res.lt.min) then
        min=res
        mina=ar(1,1)
        minb=ar(2,2)
        minc=ar(3,3)
      endif
c     print*,min
1000  continue
c
       print*,mina,minb,minc,min
c
      end
c
      subroutine diag(nm,n,ar,ai,w,matz,zr,zi,fv1,fv2,fm1,ierr)
c
      integer i,j,n,nm,ierr,matz
      double precision ar(nm,n),ai(nm,n),w(n),zr(nm,n),zi(nm,n),
     x       fv1(n),fv2(n),fm1(2,n)
c
c     this subroutine calls the recommended sequence of
c     subroutines from the eigensystem subroutine package (eispack)
c     to find the eigenvalues and eigenvectors (if desired)
c     of a complex hermitian matrix.
c
c     on input
c
c        nm  must be set to the row dimension of the two-dimensional
c        array parameters as declared in the calling program
c        dimension statement.
c
c        n  is the order of the matrix  a=(ar,ai).
```



```
c
c        ar  and  ai  contain the real and imaginary parts,
c        respectively, of the complex hermitian matrix.
c
c        matz  is an integer variable set equal to zero if
c        only eigenvalues are desired.  otherwise it is set to
c        any non-zero integer for both eigenvalues and eigenvectors.
c
c     on output
c
c        w  contains the eigenvalues in ascending order.
c
c        zr  and  zi  contain the real and imaginary parts,
c        respectively, of the eigenvectors if matz is not zero.
c
c        ierr  is an integer output variable set equal to an error
c           completion code described in the documentation for tqlrat
c           and tql2.  the normal completion code is zero.
c
c        fv1, fv2, and  fm1  are temporary storage arrays.
c
c     questions and comments should be directed to burton s. garbow,
c     mathematics and computer science div, argonne national laboratory
c
c     this version dated august 1983.
c
c     ------------------------------------------------------------------
c
      if (n .le. nm) go to 10
      ierr = 10 * n
      go to 50
c
   10 call  htridi(nm,n,ar,ai,w,fv1,fv2,fm1)
      if (matz .ne. 0) go to 20
c     .......... find eigenvalues only ..........
      call  tqlrat(n,w,fv2,ierr)
      go to 50
c     .......... find both eigenvalues and eigenvectors ..........
   20 do 40 i = 1, n
c
         do 30 j = 1, n
            zr(j,i) = 0.0d0
   30    continue
c
         zr(i,i) = 1.0d0
   40 continue
c
      call  tql2(nm,n,w,fv1,zr,ierr)
      if (ierr .ne. 0) go to 50
      call  htribk(nm,n,ar,ai,fm1,n,zr,zi)
   50 return
      end
c
c
      subroutine htribk(nm,n,ar,ai,tau,m,zr,zi)
c
      integer i,j,k,l,m,n,nm
      double precision ar(nm,n),ai(nm,n),tau(2,n),zr(nm,m),zi(nm,m)
      double precision h,s,si
c
c     this subroutine is a translation of a complex analogue of
c     the algol procedure trbak1, num. math. 11, 181-195(1968)
c     by martin, reinsch, and wilkinson.
c     handbook for auto. comp., vol.ii-linear algebra, 212-226(1971).
c
c     this subroutine forms the eigenvectors of a complex hermitian
c     matrix by back transforming those of the corresponding
c     real symmetric tridiagonal matrix determined by  htridi.
c
```

```
c     on input
c
c        nm must be set to the row dimension of two-dimensional
c          array parameters as declared in the calling program
c          dimension statement.
c
c        n is the order of the matrix.
c
c        ar and ai contain information about the unitary trans-
c          formations used in the reduction by  htridi  in their
c          full lower triangles except for the diagonal of ar.
c
c        tau contains further information about the transformations.
c
c        m is the number of eigenvectors to be back transformed.
c
c        zr contains the eigenvectors to be back transformed
c          in its first m columns.
c
c     on output
c
c        zr and zi contain the real and imaginary parts,
c          respectively, of the transformed eigenvectors
c          in their first m columns.
c
c     note that the last component of each returned vector
c     is real and that vector euclidean norms are preserved.
c
c     questions and comments should be directed to burton s. garbow,
c     mathematics and computer science div, argonne national laboratory
c
c     this version dated august 1983.
c
c     ------------------------------------------------------------------
c
      if (m .eq. 0) go to 200
c     .......... transform the eigenvectors of the real symmetric
c                tridiagonal matrix to those of the hermitian
c                tridiagonal matrix. ..........
      do 50 k = 1, n
c
         do 50 j = 1, m
            zi(k,j) = -zr(k,j) * tau(2,k)
            zr(k,j) = zr(k,j) * tau(1,k)
   50 continue
c
      if (n .eq. 1) go to 200
c     .......... recover and apply the householder matrices ..........
      do 140 i = 2, n
         l = i - 1
         h = ai(i,i)
         if (h .eq. 0.0d0) go to 140
c
         do 130 j = 1, m
            s = 0.0d0
            si = 0.0d0
c
            do 110 k = 1, l
               s = s + ar(i,k) * zr(k,j) - ai(i,k) * zi(k,j)
               si = si + ar(i,k) * zi(k,j) + ai(i,k) * zr(k,j)
  110       continue
c     .......... double divisions avoid possible underflow ..........
            s = (s / h) / h
            si = (si / h) / h
c
            do 120 k = 1, l
               zr(k,j) = zr(k,j) - s * ar(i,k) - si * ai(i,k)
               zi(k,j) = zi(k,j) - si * ar(i,k) + s * ai(i,k)
  120       continue
```



```
c
  130    continue
c
  140 continue
c
  200 return
      end
c
c
      subroutine htridi(nm,n,ar,ai,d,e,e2,tau)
c
      integer i,j,k,l,n,ii,nm,jp1
      double precision ar(nm,n),ai(nm,n),d(n),e(n),e2(n),tau(2,n)
      double precision f,g,h,fi,gi,hh,si,scale,pythag
c
c     this subroutine is a translation of a complex analogue of
c     the algol procedure tred1, num. math. 11, 181-195(1968)
c     by martin, reinsch, and wilkinson.
c     handbook for auto. comp., vol.ii-linear algebra, 212-226(1971).
c
c     this subroutine reduces a complex hermitian matrix
c     to a real symmetric tridiagonal matrix using
c     unitary similarity transformations.
c
c     on input
c
c        nm must be set to the row dimension of two-dimensional
c          array parameters as declared in the calling program
c          dimension statement.
c
c        n is the order of the matrix.
c
c        ar and ai contain the real and imaginary parts,
c          respectively, of the complex hermitian input matrix.
c          only the lower triangle of the matrix need be supplied.
c
c     on output
c
c        ar and ai contain information about the unitary trans-
c          formations used in the reduction in their full lower
c          triangles.  their strict upper triangles and the
c          diagonal of ar are unaltered.
c
c        d contains the diagonal elements of the the tridiagonal matrix.
c
c        e contains the subdiagonal elements of the tridiagonal
c          matrix in its last n-1 positions.  e(1) is set to zero.
c
c        e2 contains the squares of the corresponding elements of e.
c          e2 may coincide with e if the squares are not needed.
c
c        tau contains further information about the transformations.
c
c     calls pythag for  dsqrt(a*a + b*b) .
c
c     questions and comments should be directed to burton s. garbow,
c     mathematics and computer science div, argonne national laboratory
c
c     this version dated august 1983.
c
c     ------------------------------------------------------------------
c
      tau(1,n) = 1.0d0
      tau(2,n) = 0.0d0
c
      do 100 i = 1, n
  100 d(i) = ar(i,i)
c     .......... for i=n step -1 until 1 do -- ..........
      do 300 ii = 1, n
```

```
        i = n + 1 - ii
        l = i - 1
        h = 0.0d0
        scale = 0.0d0
        if (l .lt. 1) go to 130
c     ..... scale row (algol tol then not needed) .....
        do 120 k = 1, l
  120   scale = scale + dabs(ar(i,k)) + dabs(ai(i,k))
c
        if (scale .ne. 0.0d0) go to 140
        tau(1,l) = 1.0d0
        tau(2,l) = 0.0d0
  130   e(i) = 0.0d0
        e2(i) = 0.0d0
        go to 290
c
  140   do 150 k = 1, l
           ar(i,k) = ar(i,k) / scale
           ai(i,k) = ai(i,k) / scale
           h = h + ar(i,k) * ar(i,k) + ai(i,k) * ai(i,k)
  150   continue
c
        e2(i) = scale * scale * h
        g = dsqrt(h)
        e(i) = scale * g
        f = pythag(ar(i,l),ai(i,l))
c     ..... form next diagonal element of matrix t .....
        if (f .eq. 0.0d0) go to 160
        tau(1,l) = (ai(i,l) * tau(2,i) - ar(i,l) * tau(1,i)) / f
        si = (ar(i,l) * tau(2,i) + ai(i,l) * tau(1,i)) / f
        h = h + f * g
        g = 1.0d0 + g / f
        ar(i,l) = g * ar(i,l)
        ai(i,l) = g * ai(i,l)
        if (l .eq. 1) go to 270
        go to 170
  160   tau(1,l) = -tau(1,i)
        si = tau(2,i)
        ar(i,l) = g
  170   f = 0.0d0
c
        do 240 j = 1, l
           g = 0.0d0
           gi = 0.0d0
c     ..... form element of a*u .....
           do 180 k = 1, j
              g = g + ar(j,k) * ar(i,k) + ai(j,k) * ai(i,k)
              gi = gi - ar(j,k) * ai(i,k) + ai(j,k) * ar(i,k)
  180      continue
c
           jp1 = j + 1
           if (l .lt. jp1) go to 220
c
           do 200 k = jp1, l
              g = g + ar(k,j) * ar(i,k) - ai(k,j) * ai(i,k)
              gi = gi - ar(k,j) * ai(i,k) - ai(k,j) * ar(i,k)
  200      continue
c     ..... form element of p .....
  220      e(j) = g / h
           tau(2,j) = gi / h
           f = f + e(j) * ar(i,j) - tau(2,j) * ai(i,j)
  240   continue
c
        hh = f / (h + h)
c     ..... form reduced a .....
        do 260 j = 1, l
           f = ar(i,j)
           g = e(j) - hh * f
           e(j) = g
```



```
           fi = -ai(i,j)
           gi = tau(2,j) - hh * fi
           tau(2,j) = -gi
c
           do 260 k = 1, j
              ar(j,k) = ar(j,k) - f * e(k) - g * ar(i,k)
     x                          + fi * tau(2,k) + gi * ai(i,k)
              ai(j,k) = ai(j,k) - f * tau(2,k) - g * ai(i,k)
     x                          - fi * e(k) - gi * ar(i,k)
  260   continue
c
  270   do 280 k = 1, l
           ar(i,k) = scale * ar(i,k)
           ai(i,k) = scale * ai(i,k)
  280   continue
c
        tau(2,l) = -si
  290   hh = d(i)
        d(i) = ar(i,i)
        ar(i,i) = hh
        ai(i,i) = scale * dsqrt(h)
  300 continue
c
      return
      end
c
c
      double precision function pythag(a,b)
      double precision a,b
c
c     finds dsqrt(a**2+b**2) without overflow or destructive underflow
c
      double precision p,r,s,t,u
      p = dmax1(dabs(a),dabs(b))
      if (p .eq. 0.0d0) go to 20
      r = (dmin1(dabs(a),dabs(b))/p)**2
   10 continue
         t = 4.0d0 + r
         if (t .eq. 4.0d0) go to 20
         s = r/t
         u = 1.0d0 + 2.0d0*s
         p = u*p
         r = (s/u)**2 * r
      go to 10
   20 pythag = p
      return
      end
c
c
      subroutine tql2(nm,n,d,e,z,ierr)
c
      integer i,j,k,l,m,n,ii,l1,l2,nm,mml,ierr
      double precision d(n),e(n),z(nm,n)
      double precision c,c2,c3,dl1,el1,f,g,h,p,r,s,s2,tst1,tst2,pythag
c
c     this subroutine is a translation of the algol procedure tql2,
c     num. math. 11, 293-306(1968) by bowdler, martin, reinsch, and
c     wilkinson.
c     handbook for auto. comp., vol.ii-linear algebra, 227-240(1971).
c
c     this subroutine finds the eigenvalues and eigenvectors
c     of a symmetric tridiagonal matrix by the ql method.
c     the eigenvectors of a full symmetric matrix can also
c     be found if  tred2  has been used to reduce this
c     full matrix to tridiagonal form.
c
c     on input
c
c        nm must be set to the row dimension of two-dimensional
```

```
c          array parameters as declared in the calling program
c          dimension statement.
c
c        n is the order of the matrix.
c
c        d contains the diagonal elements of the input matrix.
c
c        e contains the subdiagonal elements of the input matrix
c          in its last n-1 positions.  e(1) is arbitrary.
c
c        z contains the transformation matrix produced in the
c          reduction by  tred2, if performed.  if the eigenvectors
c          of the tridiagonal matrix are desired, z must contain
c          the identity matrix.
c
c      on output
c
c        d contains the eigenvalues in ascending order.  if an
c          error exit is made, the eigenvalues are correct but
c          unordered for indices 1,2,...,ierr-1.
c
c        e has been destroyed.
c
c        z contains orthonormal eigenvectors of the symmetric
c          tridiagonal (or full) matrix.  if an error exit is made,
c          z contains the eigenvectors associated with the stored
c          eigenvalues.
c
c        ierr is set to
c          zero       for normal return,
c          j          if the j-th eigenvalue has not been
c                     determined after 30 iterations.
c
c     calls pythag for  dsqrt(a*a + b*b) .
c
c     questions and comments should be directed to burton s. garbow,
c     mathematics and computer science div, argonne national laboratory
c
c     this version dated august 1983.
c
c     ------------------------------------------------------------------
c
      ierr = 0
      if (n .eq. 1) go to 1001
c
      do 100 i = 2, n
  100 e(i-1) = e(i)
c
      f = 0.0d0
      tst1 = 0.0d0
      e(n) = 0.0d0
c
      do 240 l = 1, n
         j = 0
         h = dabs(d(l)) + dabs(e(l))
         if (tst1 .lt. h) tst1 = h
c     .......... look for small sub-diagonal element ..........
         do 110 m = l, n
            tst2 = tst1 + dabs(e(m))
            if (tst2 .eq. tst1) go to 120
c     .......... e(n) is always zero, so there is no exit
c                through the bottom of the loop ..........
  110    continue
c
  120    if (m .eq. l) go to 220
  130    if (j .eq. 30) go to 1000
         j = j + 1
c     .......... form shift ..........
         l1 = l + 1
```



```
         l2 = l1 + 1
         g = d(l)
         p = (d(l1) - g) / (2.0d0 * e(l))
         r = pythag(p,1.0d0)
         d(l) = e(l) / (p + dsign(r,p))
         d(l1) = e(l) * (p + dsign(r,p))
         dl1 = d(l1)
         h = g - d(l)
         if (l2 .gt. n) go to 145
c
         do 140 i = l2, n
  140    d(i) = d(i) - h
c
  145    f = f + h
c     .......... ql transformation ..........
         p = d(m)
         c = 1.0d0
         c2 = c
         el1 = e(l1)
         s = 0.0d0
         mml = m - l
c     .......... for i=m-1 step -1 until l do -- ..........
         do 200 ii = 1, mml
            c3 = c2
            c2 = c
            s2 = s
            i = m - ii
            g = c * e(i)
            h = c * p
            r = pythag(p,e(i))
            e(i+1) = s * r
            s = e(i) / r
            c = p / r
            p = c * d(i) - s * g
            d(i+1) = h + s * (c * g + s * d(i))
c     .......... form vector ..........
            do 180 k = 1, n
               h = z(k,i+1)
               z(k,i+1) = s * z(k,i) + c * h
               z(k,i) = c * z(k,i) - s * h
  180       continue
c
  200    continue
c
         p = -s * s2 * c3 * el1 * e(l) / dl1
         e(l) = s * p
         d(l) = c * p
         tst2 = tst1 + dabs(e(l))
         if (tst2 .gt. tst1) go to 130
  220    d(l) = d(l) + f
  240 continue
c     .......... order eigenvalues and eigenvectors ..........
      do 300 ii = 2, n
         i = ii - 1
         k = i
         p = d(i)
c
         do 260 j = ii, n
            if (d(j) .ge. p) go to 260
            k = j
            p = d(j)
  260    continue
c
         if (k .eq. i) go to 300
         d(k) = d(i)
         d(i) = p
c
         do 280 j = 1, n
            p = z(j,i)
```

```
            z(j,i) = z(j,k)
            z(j,k) = p
  280    continue
c
  300 continue
c
      go to 1001
c     .......... set error -- no convergence to an
c                eigenvalue after 30 iterations ..........
 1000 ierr = l
 1001 return
      end
c
c
**** for old version, "send otqlrat from eispack"
** From dana!moler Tue, 1 Sep 87 10:15:40 PDT
** New TQLRAT
      SUBROUTINE TQLRAT(N,D,E2,IERR)
C
      INTEGER I,J,L,M,N,II,L1,MML,IERR
      DOUBLE PRECISION D(N),E2(N)
      DOUBLE PRECISION B,C,F,G,H,P,R,S,T,EPSLON,PYTHAG
C
C     This subroutine is a translation of the Algol procedure tqlrat,
C     Algorithm 464, Comm. ACM 16, 689(1973) by Reinsch.
C
C     This subroutine finds the eigenvalues of a symmetric
C     tridiagonal matrix by the rational QL method.
C
C     On input
C
C        N is the order of the matrix.
C
C        D contains the diagonal elements of the input matrix.
C
C        E2 contains the squares of the subdiagonal elements of the
C          input matrix in its last N-1 positions.  E2(1) is arbitrary.
C
C      On output
C
C        D contains the eigenvalues in ascending order.  If an
C          error exit is made, the eigenvalues are correct and
C          ordered for indices 1,2,...IERR-1, but may not be
C          the smallest eigenvalues.
C
C        E2 has been destroyed.
C
C        IERR is set to
C          zero       for normal return,
C          J          if the J-th eigenvalue has not been
C                     determined after 30 iterations.
C
C     Calls PYTHAG for  DSQRT(A*A + B*B) .
C
C     Questions and comments should be directed to Burton S. Garbow,
C     Mathematics and Computer Science Div, Argonne National Laboratory
C
C     This version dated August 1987.
C     Modified by C. Moler to fix underflow/overflow difficulties,
C     especially on the VAX and other machines where epslon(1.0d0)**2
C     nearly underflows.  See the loop involving statement 102 and
C     the two statements just before statement 200.
C
C     ------------------------------------------------------------------
C
      IERR = 0
      IF (N .EQ. 1) GO TO 1001
C
      DO 100 I = 2, N
```



```
  100 E2(I-1) = E2(I)
C
      F = 0.0D0
      T = 0.0D0
      E2(N) = 0.0D0
C
      DO 290 L = 1, N
         J = 0
         H = DABS(D(L)) + DSQRT(E2(L))
         IF (T .GT. H) GO TO 105
         T = H
         B = EPSLON(T)
         C = B * B
         if (c .ne. 0.0d0) go to 105
C        Spliting tolerance underflowed.  Look for larger value.
         do 102 i = l, n
            h = dabs(d(i)) + dsqrt(e2(i))
            if (h .gt. t) t = h
  102    continue
         b = epslon(t)
         c = b * b
C     .......... LOOK FOR SMALL SQUARED SUB-DIAGONAL ELEMENT ..........
  105    DO 110 M = L, N
            IF (E2(M) .LE. C) GO TO 120
C     .......... E2(N) IS ALWAYS ZERO, SO THERE IS NO EXIT
C                THROUGH THE BOTTOM OF THE LOOP ..........
  110    CONTINUE
C
  120    IF (M .EQ. L) GO TO 210
  130    IF (J .EQ. 30) GO TO 1000
         J = J + 1
C     .......... FORM SHIFT ..........
         L1 = L + 1
         S = DSQRT(E2(L))
         G = D(L)
         P = (D(L1) - G) / (2.0D0 * S)
         R = PYTHAG(P,1.0D0)
         D(L) = S / (P + DSIGN(R,P))
         H = G - D(L)
C
         DO 140 I = L1, N
  140    D(I) = D(I) - H
C
         F = F + H
C     .......... RATIONAL QL TRANSFORMATION ..........
         G = D(M)
         IF (G .EQ. 0.0D0) G = B
         H = G
         S = 0.0D0
         MML = M - L
C     .......... FOR I=M-1 STEP -1 UNTIL L DO -- ..........
         DO 200 II = 1, MML
            I = M - II
            P = G * H
            R = P + E2(I)
            E2(I+1) = S * R
            S = E2(I) / R
            D(I+1) = H + S * (H + D(I))
            G = D(I) - E2(I) / G
C           Avoid division by zero on next pass
            if (g .eq. 0.0d0) g = epslon(d(i))
            h = g * (p / r)
  200    CONTINUE
C
         E2(L) = S * G
         D(L) = H
C     .......... GUARD AGAINST UNDERFLOW IN CONVERGENCE TEST ..........
         IF (H .EQ. 0.0D0) GO TO 210
         IF (DABS(E2(L)) .LE. DABS(C/H)) GO TO 210
```

```
         E2(L) = H * E2(L)
         IF (E2(L) .NE. 0.0D0) GO TO 130
  210    P = D(L) + F
C     .......... ORDER EIGENVALUES ..........
         IF (L .EQ. 1) GO TO 250
C     .......... FOR I=L STEP -1 UNTIL 2 DO -- ..........
         DO 230 II = 2, L
            I = L + 2 - II
            IF (P .GE. D(I-1)) GO TO 270
            D(I) = D(I-1)
  230    CONTINUE
C
  250    I = 1
  270    D(I) = P
  290 CONTINUE
C
      GO TO 1001
C     .......... SET ERROR -- NO CONVERGENCE TO AN
C                EIGENVALUE AFTER 30 ITERATIONS ..........
 1000 IERR = L
 1001 RETURN
      END
c
c
      double precision function epslon (x)
      double precision x
c
c     estimate unit roundoff in quantities of size x.
c
      double precision a,b,c,eps
c
c     this program should function properly on all systems
c     satisfying the following two assumptions,
c        1.  the base used in representing floating point
c            numbers is not a power of three.
c        2.  the quantity  a  in statement 10 is represented to
c            the accuracy used in floating point variables
c            that are stored in memory.
c     the statement number 10 and the go to 10 are intended to
c     force optimizing compilers to generate code satisfying
c     assumption 2.
c     under these assumptions, it should be true that,
c            a  is not exactly equal to four-thirds,
c            b  has a zero for its last bit or digit,
c            c  is not exactly equal to one,
c            eps  measures the separation of 1.0 from
c                 the next larger floating point number.
c     the developers of eispack would appreciate being informed
c     about any systems where these assumptions do not hold.
c
c     this version dated 4/6/83.
c
      a = 4.0d0/3.0d0
   10 b = a - 1.0d0
      c = b + b + b
      eps = dabs(c-1.0d0)
      if (eps .eq. 0.0d0) go to 10
      epslon = eps*dabs(x)
      return
      end
c
```

```
(*Remove["Global`*"];*)
ClearAll["Global`*"];
<< Statistics`NonlinearFit`
<< statist`descript`
<< statist`correl`
Off[General::"spell"];
Off[General::"spell1"];

ClearAll["Global`*"]
d[1] = 1;
d[2] = 2;
d[3] = 1;
n[1] = 0;
n[2] = 0;
n[3] = 0;

para = {omega[1], omega[2], omega[3], x[1, 1], x[2, 2], x[3, 3], x[1, 2],
      x[2, 3], g22, x[1, 3], yll[2], y[2, 2, 2], y[3, 3, 3], y[2, 3, 3]};

data = {{0, 1, 0, 1, 525.220093}, {0, 0, 1, 0, 1231.403773}, {0, 2, 0, 0,
      1037.501801}, {0, 2, 0, 2, 1037.501801 + 4*3.85701303}, {0, 1, 1, 1,
      1757.393385}, {0, 0, 2, 0, 2452.975}, {0, 4, 0, 0, 2055.992922}, {1, 0,
      0, 0, 2429.025}, {1, 1, 0, 1, 2943.35}, {2, 0, 0, 0, 4800.557}, {1, 0,
      2, 0, 4870.46}, {0, 0, 4, 0, 4865.34}, {0, 1, 2, 1, 2979.84}, {0, 4, 0,
      2, 2055.992922 + 4*3.765680219}, {0, 4, 0, 4,
      2055.992922 + 16*3.765680219 - 0.39160*10^-3*256}, {0, 3, 0, 1,
      1548.973790 + 3.804095150}, {0, 3, 0, 3, 1548.973790 + 9*3.804095150}}

gewicht = 1/{1.4*10^-7,
          1.7*10^-7,
          1.5*10^-7,
          1.5*10^-7,
          2.6*10^-7,
          4.2*10^-2,
          3.2*10^-7,
          4.2*10^-2,
          0.34,
          8.8*10^-2,
          0.44,
          0.80,
          0.34,
          3.2*10^-7,
          3.2*10^-7,
          1.7*10^-7,
          1.7*10^-7}^2;


normalizedweights = gewicht*HarmonicMean[1/gewicht]
Mean[normalizedweights]

y[1, 1, 1] = 0;
y[1, 2, 1] = 0;
y[1, 2, 2] = 0;
y[1, 3, 1] = 0;
y[1, 3, 2] = 0;
y[1, 3, 3] = 0;
(*y[2, 2, 2] = 0;*)
y[2, 3, 2] = 0;
(*y[2, 3, 3] = 0;*)
(*y[3, 3, 3] = 0;*)

yll[1] = 0;
(*yll[2] = 0;*)
yll[3] = 0;

z[1, 1, 1, 1] = 0;
z[1, 1, 1, 2] = 0;
z[1, 1, 1, 3] = 0;
z[1, 2, 1, 2] = 0;
```



```
z[1, 2, 1, 3] = 0;
z[1, 2, 2, 2] = 0;
z[1, 2, 2, 3] = 0;
z[1, 3, 1, 3] = 0;
z[1, 3, 2, 3] = 0;
z[1, 3, 3, 3] = 0;
z[2, 2, 2, 2] = 0;
z[2, 2, 2, 3] = 0;
z[2, 3, 2, 3] = 0;
z[2, 3, 3, 3] = 0;
z[3, 3, 3, 3] = 0;

zll[1, 1] = 0;
zll[1, 2] = 0;
zll[1, 3] = 0;
zll[2, 2] = 0;
zll[2, 3] = 0;
zll[3, 3] = 0;

zllll = 0;

z222ll = 0;

z22222 = 0;


gv[n_] = Sum[omega[i]*(n[i] + d[i]/2), {i, 1, 3}] +
      Sum[Sum[x[i, j]*(n[i] + d[i]/2)*(n[j] + d[j]/2), {i, 1, j}], {j, 1,
         3}] + Sum[
        Sum[Sum[y[i, j,
                k] (n[i] + d[i]/2) (n[j] + d[j]/2) (n[k] + d[k]/2), {i, 1,
              k}], {k, 1, j}], {j, 1, 3}] +
      Sum[yll[i] (n[i] + d[i]/2) l^2, {i, 1, 3}] +
      Sum[
        Sum[Sum[Sum[
              z[i, j, k,
                  h] (n[i] + d[i]/2) (n[j] + d[j]/2) (n[k] + d[k]/2) (n[h] +
                    d[h]/2), {i, 1, k}], {k, 1, j}], {j, 1, h}], {h, 1, 3}] +
      Sum[
        Sum[zll[i, j]*(n[i] + d[i]/2)*(n[j] + d[j]/2) l^2, {i, 1, j}], {j, 1,
          3}] + z22222;


gv[v_, l_] :=
  Sum[omega[i]*(v[i] + d[i]/2), {i, 1, 3}] +
    Sum[Sum[x[i, j]*(v[i] + d[i]/2)*(v[j] + d[j]/2), {i, 1, j}], {j, 1, 3}] +
    g22* l l +
    Sum[Sum[
        Sum[y[i, j, k] (v[i] + d[i]/2) (v[j] + d[j]/2) (v[k] + d[k]/2), {i, 1,
            k}], {k, 1, j}], {j, 1, 3}] +
    Sum[yll[i] (v[i] + d[i]/2) l^2, {i, 1, 3}] +
    Sum[Sum[
        Sum[Sum[z[i, j, k,
                h] (v[i] + d[i]/2) (v[j] + d[j]/2) (v[k] + d[k]/2) (v[h] +
                  d[h]/2), {i, 1, k}], {k, 1, j}], {j, 1, h}], {h, 1, 3}] +
    Sum[Sum[zll[i, j]*(v[i] + d[i]/2)*(v[j] + d[j]/2) l^2, {i, 1, j}], {j, 1,
        3}] + zllll l^4 + z222ll (v[2] + 1)^3 l^2 + z22222 (v[2] + 1)^5
- gv[n]



e = NonlinearRegress[data, gv[v, l], {v[1], v[2], v[3], l}, para,
    Method -> Automatic, Weights -> Automatic]

standard_deviation      Sqrt[e[[3, 2]]]
```

```
ClearAll["Global‘*"]
<< Statistics‘NonlinearFit‘
<< statist‘descript‘
<< statist‘correl‘

ClearAll["Global‘*"];
Clear["be,alp[1],alp[2],alp[3],y[2,2],y[3,3],y[1,3],y[1,1],y[1,2],yll,efy[1,1,\
1],y[1,2,1],y[1,2,2],y[1,3,1],y[1,3,2],y[1,3,3],y[2,3,2],y[2,2,2],y[2,3,3],y[\
3,3,3]"]

d[1] = 1;
d[2] = 2;
d[3] = 1;

para = {be, alp[1], alp[2], alp[3], y[2, 2], yll, y[2, 3], y[3, 3], y[1, 2],
      y[2, 2, 2]};

(*, y[1, 1], y[2, 2], y[3, 3], y[1, 3], y[1, 2], y[2, 3], yll, y[1, 1]};*)

startval = {0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5};

(*be = 0;*)
y[1, 1] = 0;
(*y[2, 2] = 0;*)
(*y[3, 3] = 0;*)
(*y[1, 2] = 0;*)
y[1, 3] = 0;
(*y[2, 3] = 0;*)
(*yll = 0;*)
y[1, 1, 1] = 0;
y[1, 2, 1] = 0;
y[1, 2, 2] = 0;
y[1, 3, 1] = 0;
y[1, 3, 2] = 0;
y[1, 3, 3] = 0;
(*y[2, 2, 2] = 0;*)
y[2, 3, 2] = 0;
y[2, 3, 3] = 0;
y[3, 3, 3] = 0;

ylll[1] = 0;
ylll[2] = 0;
ylll[3] = 0;

(*data = ReadList["c:\mj\math\gv1.dat", Number, RecordLists -> True];*)

data = {{0, 0, 0, 0, 0.566537158}, {0, 1, 0, 1,
        0.5676318310 + 1.95609*10^-5}, {0, 2, 0, 0, 0.5687647224}, {0, 3, 0,
        0, 0.5698864984}, {0, 4, 0, 0, 0.5710206686}, {0, 0, 1, 0,
        0.5636780332}, {0, 0, 2, 0, 0.5608049659}, {0, 1, 1, 1,
        0.5647707334 + 1.85561*10^-5}, {1, 0, 0, 0, 0.5631655208}, {2, 0, 0,
        0, 0.5597959511}, {0, 0, 4, 0, 0.5550902938}, {1, 0, 2, 0,
        0.5573786935}, {1, 1, 0, 1, 0.5642903235 + 1.85561*10^-5}, {0, 1, 2,
        1, 0.5619149125 + 1.85561*10^-5}};

(*die Korrekturwerte sind Djl Korrekturen; fM-|r 010 aus der Reihe 020, 030,
  040 extrapoliert und fM-|r 012, 110,
  011 aus dem Fit von 120 alleine ohne den Resonanzpartner 022 auf dessen Djl \
- Wert gesetzt.*)


gewicht = 1/{1.4*10^-8,
        1.4*10^-8,
        1.6*10^-8,
        5.0*10^-8,
        3.3*10^-7,
        4.0*10^-8,
        4.0*10^-6,
        1.9*10^-7,
```



```
        4.0*10^-6,
        2.9*10^-6,
        0.00015,
        7.8*10^-5,
        2.2*10^-5,
        2.2*10^-5}^2


normalizedweights = gewicht*HarmonicMean[1/gewicht]

(*gewicht = 1/{1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1}^2*)


bv[v_, k_] :=
  be - Sum[alp[i]*(v[i] + d[i]/2), {i, 1, 3}] +
    Sum[Sum[y[i, j]*(v[i] + d[i]/2)*(v[j] + d[j]/2), {i, 1, j}], {j, 1, 3}] +
    yll*k^2 +
    Sum[Sum[Sum[
          y[i, j, m] (v[i] + d[i]/2) (v[j] + d[j]/2) (v[m] + d[m]/2), {i, 1,
          m}], {m, 1, j}], {j, 1, 3}] +
    Sum[ylll[i] (v[i] + d[i]/2) k^2, {i, 1, 3}]

ef = NonlinearRegress[data, bv[v, k], {v[1], v[2], v[3], k},
    Transpose[{para, startval}], Method -> Automatic,
    Weights -> normalizedweights]
```


C ALPHA.NB

```
ClearAll["Global‘*"] ;
<< Statistics‘NonlinearFit‘
<< statist‘descript‘
<< statist‘correl‘
<< Statistics‘DescriptiveStatistics‘

ClearAll["Global‘*"];
Clear["de,betta[1],bettta[2],beta[3],betta[1,1],betta[2,2],betta[3,3],betta[1,\
2],betta[1,3],betta[2,3],bettall"]

d[1] = 1;
d[2] = 2;
d[3] = 1;

para = {de, betta[2], betta[1], betta[2, 2], betta[3]};

(*de = 0;*)
(*betta[1] = 0;*)
(*betta[2] = 0;*)
(*betta[3] = 0;*)
betta[1, 1] = 0;
(*betta[2, 2] = 0;*)
betta[3, 3] = 0;
betta[1, 2] = 0;
betta[1, 3] = 0;
betta[2, 3] = 0;
bettall = 0;
betta22 = 0;

(*data = ReadList["c:\mj\math\gv1.dat", Number, RecordLists -> True];*)

data = {{0, 0, 0, 0, 4.767659*10^-7}, {0, 1, 0, 1,
      4.853896*10^-7 + 7.75*10^-10}, {0, 2, 0, 0, 4.964732*10^-7}, {0, 3, 0,
      0, 5.073097*10^-7}, {0, 4, 0, 0, 5.19467*10^-7}, {0, 0, 1, 0,
      4.769454*10^-7}, {0, 0, 2, 0, 4.776602*10^-7}, {0, 1, 1, 1,
      4.860720*10^-7 + 7.75*10^-10}, {1, 0, 0, 0, 4.718192*10^-7}, {2, 0, 0,
      0, 4.642761*10^-7}, {0, 0, 4, 0, 5.024858*10^-7}, {1, 0, 2, 0,
      4.483862*10^-7}, {1, 1, 0, 1, 4.820225*10^-7 + 7.75*10^-10}, {0, 1, 2,
      1, 4.832169*10^-7 + 7.75*10^-10}}

(*die Korrekturwerte sind Hjl Korrekturen;
  fM-|r alle v2 = 1 wurde der Hjl - Wert des Niveaus 020 zugrunde gelegt.
        Eine Extrapolation von 010 hM-dtte keinen Sinn gemacht,
  da die Hjl s keine eindeutige Tendenz aufweisen
    (Hjl s von 020, 030, 040.*)


gewicht = 1/{3.5*10^-11,
          3.4*10^-11,
          3.4*10^-11,
          1.4*10^-10,
          2.8*10^-10,
          3.7*10^-11,
          5.8*10^-10,
          5.0*10^-10,
          5.7*10^-10,
          1.2*10^-9,
          1.4*10^-8,
          7.4*10^-9,
          1.7*10^-9,
          1.7*10^-9}^2;


normalizedweights = gewicht*HarmonicMean[1/gewicht]

Mean[normalizedweights]

 (*man sieht am Ergebnis das der gemittelte Mittelwert der normalizedweights \
wieder 1.0 als ergibt,
```



```
  somit sind Standardabweichungen aus gewichteten und ungewichteten Fits \
direkt vergleichbar, wenn natM-|rlich auch die Parameter,
  die in dem jeweiligen Fall angepasst werden kM-vnnen,
  vershcieden sien kM-vnnen!!*)

(*gewicht = 1/{1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1}^2*)


dv[v_, k_] :=
  de + Sum[betta[i]*(v[i] + d[i]/2), {i, 1, 3}] +
    Sum[Sum[betta[i, j]*(v[i] + d[i]/2)*(v[j] + d[j]/2), {i, 1, j}], {j, 1,
        3}] + bettall*k^2 + betta22*(v[2] + 1)^2

ef = NonlinearRegress[data, dv[v, k], {v[1], v[2], v[3], k}, para,
    Method -> Automatic, Weights -> normalizedweights]
Sqrt[ef[[3, 2]]]    standard_Deviation
```