^{98}Mo(d,d′) 1992Pi08,1990Pi14,1977Pe18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020

Includes (pol d,d).

1992Pi08, 1990Pi14: E=50.7 MeV deuteron beam was produced from the KVI cyclotron. Target was 97% enriched ^{98}Mo with thickness of the order of 1 mg/cm^2. Scattered particles were momentum-analyzed with the KVI QMG/2 magnetic spectrograph (FWHM=15 keV) and detected by a multiwire drift chamber backed by a scintillator. Measured $\sigma(\theta)$ from 7.5° to 37.5°. Deduced levels, J, π, L-transfers, transition strengths, deformation parameters from coupled-channel analysis and IBA-model analysis. Uncertainty on cross sections is 10% for absolute and 5% for relative values. The data are reported for octupole excitations by 1990Pi14 and those for hexadecapole transitions by 1992Pi08.

1977Pe18: E=17.2 MeV beam was produced from the University of Colorado AVF cyclotron. Target was about 50 μg/cm^2 highly-enriched ^{98}Mo on a carbon foil. Scattered particles were momentum-analyzed with a magnetic spectrograph (FWHM=15 keV) and detected with a proportional counter backed by a plastic scintillator. Measured $\sigma(\theta)$. Deduced levels, J, π, L-transfers, transition strengths, deformation parameters from DWBA analysis. Report data for seven levels.

1978Wa11: E=21.5 MeV beam from the variable-energy cyclotron at the Institute of Physical and Chemical Research. Scattered particles were detected with a ΔE-E counter telescope (FWHM=80 keV) of two surface-barrier silicon detectors. Measured $\sigma(\theta)$ from 20° to 150°. Deduced levels, J, π, L-transfers, deformation parameters from coupled-channel analysis. Report data for six levels.

Others:

1999Ho27: E=16.0 MeV. Measured $\sigma(\theta)$ for first 5$^-$ state and a 4$^+$ state with the Sao Paulo Pelletron-Enge spectrograph (FWHM=12 keV). Deduced deformation parameters from DWBA analysis.

2001Uk01: E=13.2, 16.0 MeV. Measured $\sigma(\theta)$ for first 2$^+$ and first 3$^-$ states with the Sao Paulo Pelletron-Enge spectrograph (FWHM=8-12 keV). Deduced deformation parameters from DWBA-deformed optical model analysis.

1966Ki04: E=15 MeV. FWHM=40-50 keV. Data at 45° and 60° for six levels. Cross section values are given.

1981Bi09,1975Vi06: (pol d,d) E=12 MeV. Measured analyzing power.

^{98}Mo Levels

B(E4)(W.u.) values given under comments are deduced by 1992Pi08 from the average of isoscalar matrix elements from their (p,p′) and (d,d′) data if both are available, unless otherwise noted. %EWSR is also from 1992Pi08.

cross sections from 1966Ki04

E(level)	dσ/dΩ (mb/sr) at 60°	dσ/dΩ (mb/sr) at 45°
790	1.4	2.7
1760	0.048	0.081
1930	0.18	
2040	1.28	0.58
2180	0.049	0.16
2360	0.097	0.11

E(level)†	L†	β_L†	Comments
0	0		
735 *5*	0		E(level),L: from 1977Pe18. Additional information 1.
787 *2*	2	0.167 *4*	β_L: from 2001Uk01. Others: 0.153 (1978Wa11), 0.155 (1977Pe18). 1990Pi14 used β_2=0.163 in analysis of data for other levels. B(E2)=0.56 (1977Pe18), B(E2)/β(ISL)=1.46 *16* (2001Uk01).

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^{98}Mo(d,d′) 1992Pi08,1990Pi14,1977Pe18 (continued)

^{98}Mo Levels (continued)

E(level)[†]	L[†]	β_L[†]	Comments
1433 *2*	2	0.046	β_L: from 1977Pe18. B(E2)=0.050 (1977Pe18).
1510 *2*	4	0.021	β_L: other: 0.053 (1977Pe18). B(E4)(W.u.)=1.47 *36*, %EWSR=0.042.
1760 *2*	2	0.029	β_L: from 1977Pe18. B(E2)=0.0192 (1977Pe18).
1871 *2*	2		
1930?			E(level): from 1966Ki04 only.
2018 *2*	3	0.191 *4*	β_L: from 2001Uk01. Others: 0.180 (1990Pi14), 0.176 (1978Wa11), 0.152 (1977Pe18), 0.24 (at 60°) or 0.15 (at 45°) (1966Ki04). B(E3)/β(ISL)=1.2 *3* (2001Uk01).
2209 *2*	0		E(level): a 2180 group from 1966Ki04 probably corresponds to 2209.
2224 *2*	4	−0.031	B(E4)(W.u.)=3.44 *24*, %EWSR=0.144.
2333 *2*	2		
2334 *2*	4	−0.048	B(E4)(W.u.)=8.1 *18*, %EWSR=0.037.
2350 *2*	2		
2369 *2*	2		
2419 *2*	2		
2484 *2*	(3)		
2509 *2*	1		
2525[‡] *5*	(1)		
2537 *5*	(1)		
2560[‡] *5*			
2574 *2*	4	0.061 *3*	E(level),β_L: from 1999Ho27. Other: E=2574 *5*, β_L=−0.039 (1992Pi08). B(E4)(W.u.)=8.3 *10*, %EWSR=0.404.
2622 *2*	5	0.040 *3*	E(level),β_L: from 1999Ho27. Other: E=2621 *5*, β_L=0.014 (1990Pi14).
2680[‡] *5*	(4,5)		
2699 *5*	(4)		
2733 *5*	2		
2810 *5*	2		
2837 *5*	6		
2855 *5*	4	−0.013	B(E4)(W.u.)=0.60 *19*, %EWSR=0.032.
2906 *5*	4	−0.027	B(E4)(W.u.)=3.84 *55*, %EWSR=0.211.
2920 *5*	2		
2963 *5*	3	0.012[#]	
2978 *5*	(4)	+0.041	B(E4)(W.u.)=5.27 *78*, %EWSR=0.296.
3022 *5*	5	0.072[#]	
3049 *5*	4	−0.018	B(E4)(W.u.)=1.50 *17*, %EWSR=0.086.
3067[‡] *5*			
3096 *5*	(6)		
3106 *5*	2		
3125 *5*	(3)		
3152 *5*	2		
3167 *5*	4	+0.016	B(E4)(W.u.)=0.73 *9*, %EWSR=0.044.
3214 *5*	3	0.022[#]	
3263 *5*	1		
3305 *5*	5	0.020[#]	
3328 *5*	4	−0.012	B(E4)(W.u.)=1.37 *19*, %EWSR=0.086.
3344 *5*	2		
3389 *5*	2		
3421 *5*	4	−0.024	B(E4)(W.u.)=1.95 *16*, %EWSR=0.126.
3485 *5*	2		
3524 *5*	(6)		
3560 *5*	4	+0.024	B(E4)(W.u.)=2.00 *26*, %EWSR=0.135.
3626 *5*	4	−0.020	B(E4)(W.u.)=0.96 *17*, %EWSR=0.066.

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^{98}Mo(d,d′) 1992Pi08,1990Pi14,1977Pe18 (continued)

^{98}Mo Levels (continued)

E(level)[†]	L[†]	β_L[†]	Comments
3664 *5*	4	−0.017	B(E4)(W.u.)=0.98 *11*, %EWSR=0.068.
3710 *5*	5	0.009[#]	
3737 *5*	4	−0.013	B(E4)(W.u.)=0.52 *8*, %EWSR=0.036.
3778 *5*	4	+0.016	B(E4)(W.u.)=0.80 *13*, %EWSR=0.057.
3824 *5*			
3847 *5*			
3898 *5*	(4)	−0.011	B(E4)(W.u.)=0.42 *8*, %EWSR=0.031.
3939 *5*	(4)	−0.026	B(E4)(W.u.)=2.41 *48*, %EWSR=0.179.
3978 *5*	3	0.016[#]	
3993 *5*	5		
4044 *5*	4	−0.014	B(E4)(W.u.)=0.61 *6*, %EWSR=0.047.
4117 *5*	(4,5)		
4143 *5*	4	−0.012	B(E4)(W.u.)=0.52 *7*, %EWSR=0.041.
4177 *5*	3	0.018[#]	
4247 *5*	4	−0.016	B(E4)(W.u.)=0.82 *8*, %EWSR=0.066.

[†] From 1992Pi08, unless otherwise stated. 1992Pi08 give a combined list of energies (see table 1 in 1992Pi08) from (p,p′) and (d,d′) and it is assumed that level for which β_L is not given in column #6 of Table 3 (1992Pi08) is not populated in (d,d′), even though it is listed in table 1 of 1992Pi08.

[‡] It is not clear from available data whether this level is populated in (d,d′). The population in (p,p′) seems certain.

[#] From 1990Pi14.