^{24}Mg(p,d),(pol p,d) 1986Mi01,1979Mi15,2020Kw01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171, 1 (2021)	1-Jun-2020

Other references: 1994Ku06, 1984Ha02, 1984Al21, 1982Mi10, 1980Ho18, 1980Oh06, 1979Cl03, 1975Ka10, 1968Ko11, 2001Ba17.

1986Mi01: ^{24}Mg(pol p,d) E=49.2, 94.8, 150.3 MeV. Measured $\sigma(\theta)$, $A_y(\theta)$. FWHM 200-300 keV. 1986Mi01, 1984Al21, 1982Mi10, and 1979Mi15 same research group.

1979Mi15: ^{24}Mg(p,d) E=94.8 MeV. Measured $\sigma(\theta)$, performed DWBA analysis. FHWM = 80 keV.

2020Kw01: ^{24}Mg(p,d) E=31 MeV. ΔE+E Si telescope. Measured $\sigma(\theta)$, deduced excited levels, L, spin-parity. DWBA calcualtions. 99.9% enriched target. Energy resolution to the ground state was about 0.4%.

1994Ku06: ^{24}Mg(p,d) E=34.945 MeV. Magnetic spectrograph. Deduced possible spin-parity.

^{23}Mg Levels

E(level)[†]	Jπ[b]	L[†]	S[e]	Comments
0.0	3/2$^+$	2	0.11	S: 0.12 (for 94.8 MeV) and 0.13 (for 150.3 MeV) (1986Mi01). dσ/dΩ$_{c.m.}$=1100 μb/sr at $\theta_{c.m.}$=10° (1979Mi15).
450[c] *1*	5/2$^+$	2	1.5	S: 1.8 (for 94.8 MeV) and 1.7 (for 150.3 MeV) (1986Mi01). dσ/dΩ$_{c.m.}$=6840 μb/sr at $\theta_{c.m.}$=11° (1979Mi15).
2048[c] *2*				E(level): Other: 2050 (1986Mi01).
2360	1/2$^+$	0	0.09	E(level): 2359.0 *14* (from literature) was used for internal energy calibration (2020Kw01). S: and 0.06 (for 49.2 MeV), 0.12 and 0.08 (for 94.8 MeV), 0.23 and 0.14 (for 150.3 MeV) (1986Mi01). dσ/dΩ$_{c.m.}$=118 μb/sr at $\theta_{c.m.}$=18.5° (1979Mi15).
2770	1/2$^-$	1	1.4	E(level): 2771 *1* (from literature) was used for internal energy calibration (2020Kw01). L: In 2020Kw01, σ(θ) fitted well considering L=1 and a constant contribution for DWBA calculations, instead of only L=1. S: 1.8 (for 94.8 MeV) and 1.8 (for 150.3 MeV) (1986Mi01). dσ/dΩ$_{c.m.}$>4760 μb/sr at $\theta_{c.m.}$<6.5° (1979Mi15).
2919[c] *6*	(3/2$^+$)	2	0.09	E(level): Other: 2910 − poorly resolved (1986Mi01). S: 0.095 (for 94.8 MeV) and 0.07 (for 150.3 MeV) (1986Mi01). dσ/dΩ$_{c.m.}$=955 μb/sr at $\theta_{c.m.}$=8° (1979Mi15).
3800	3/2$^-$	1	0.62	S: 0.95 (for 94.8 MeV) and 0.90 (for 150.3 MeV) (1986Mi01). dσ/dΩ$_{c.m.}$>1800 μb/sr at $\theta_{c.m.}$<6.5° (1979Mi15).
3810[c] *4*				E(level): Possible doublet of 3793 and 3859 − measured σ(θ) fitted well with considerations of L=1 (83.7%) and L=2 (16.3%) − 2020Kw01 noted. In Adopted Levels the corresponding energies are 3794.1 and 3860.6, respectively.
3974[c] *3*				E(level): Other: 3970 (1979Mi15 − Fig. 1).
4363[c] *2*	1/2$^+$	0	0.036	E(level): Other: 4360 (1986Mi01). S: and 0.025 (for 49.2 MeV), 0.070 and 0.045 (for 94.8 MeV), 0.070 0.050 (for 150.3 MeV) (1986Mi01). dσ/dΩ$_{c.m.}$=86 μb/sr at $\theta_{c.m.}$=18° (1979Mi15).
4686[c] *7*				E(level): Other: 4680 (1979Mi15 − Fig. 1). dσ/dΩ$_{c.m.}$=30 μb/sr at $\theta_{c.m.}$=21.5° (1979Mi15).
5290[#]		2		E(level): 5286 *1* (from literature) was used for internal energy calibration (2020Kw01). L: From 1982Mi10. dσ/dΩ$_{c.m.}$=910 μb/sr at $\theta_{c.m.}$=11.5° (1979Mi15).
5450?[‡]				dσ/dΩ$_{c.m.}$=4.0 μb/sr at $\theta_{c.m.}$=47° − data presented with question a ? mark in 1979Mi15, probably to indicate uncertain data.
5688[c] *7*				E(level): Other: 5690 (1979Mi15 − Fig. 1).
5990[#]		1		E(level): 5992 *1* (from literature) was used for internal energy calibration (2020Kw01). L: From 1982Mi10. dσ/dΩ$_{c.m.}$>1310 μb/sr at $\theta_{c.m.}$<6.5° (1979Mi15).
6144[c] *3*	(3/2$^+$,5/2$^+$)[c]	2[c]		E(level),Jπ: 2020Kw01 compare this level with 6129.3 and discuss the disagreement

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^{24}Mg(p,d),(pol p,d) 1986Mi01,1979Mi15,2020Kw01 (continued)

^{23}Mg Levels (continued)

E(level)[†]	J$^{\pi}$[b]	L[†]	Comments
			with $J^{\pi}=7/2^{-}$. However, the level energy is also comparable with 6132.3 keV in Adopted Levels.
6246[c] *4*			
6391[c] *2*	(3/2$^+$,5/2$^+$)[c]	2[c]	E(level),J$^{\pi}$: 2020Kw01 compare this level with 6372.5 and discuss the disagreement with $J^{\pi}=7/2^{+}$. However, the level energy is significantly different – might be considered as a different level.
6537[c] *3*	(3/2$^+$,5/2$^+$)[c]	2[cd]	E(level): Other: 6540 (1979Mi15 – Fig. 1). L: Implied from the spin and parity as of the text in 2020Kw01.
6802[c] *2*	(3/2$^+$,5/2$^+$)[c]	2[c]	E(level): Other: 6810 (1979Mi15 – Fig. 1).
6912[c] *6*	(3/2$^+$,5/2$^+$)[c]	2[cd]	
7007[c] *5*	(3/2$^+$,5/2$^+$)[c]	2[cd]	
7144[c] *4*	(3/2$^+$,5/2$^+$)[c]	2[cd]	
7260[c] *6*	(3/2$^+$,5/2$^+$)[c]	2[c]	E(level),L: Assuming the peak arose from a singlet state (2020Kw01). Other excitation energy: 7240 *20* (1979Mi15).
7441[c] *8*			E(level): Other: 7420 *30* (1979Mi15).
7585[@] *10*			E(level): Other: 7610 *30* (1979Mi15).
7625[c] *9*		4	E(level),L: Other: 7624 *10* (1994Ku06). L from 1994Ku06.
7643[@] *10*		2	L: From 1994Ku06.
7788[c] *5*	(3/2$^+$,5/2$^+$)[c]	2[cd]	E(level),L: Others: 7782 *10* (1994Ku06), 7790 *30* (1979Mi15). L=(1) (1979Mi15).
7857[c] *10*			E(level): Other: 7856 *10* (1994Ku06).
8014[@] *10*			
8044[@] *4*			E(level): Others: 8055 *10* (1994Ku06), 8060 *40* (1979Mi15).
8072[@] *10*			
8141[&] *5*			E(level): Others: 8142 at 8° (2001Ba17).
8170[ac] *4*			E(level): Others: 8170 *5* at 16° and 8168 at 8° angle (2001Ba17).
8197[&a] *5*			E(level): Other: 8195 at 8° angle (2001Ba17).
8330[c] *6*	(3/2$^+$,5/2$^+$)[c]	2[cd]	E(level),L: Assuming the peak arose from a singlet state (2020Kw01).
8436[c] *7*			E(level): Other: 8420 *40* (1979Mi15).
8610[‡] *40*			
8770[c] *8*			E(level): Other: 8770 *50* (1979Mi15).
8924[c] *5*		1[‡]	E(level): Other: 8910 *20* (1979Mi15). dσ/d$\Omega_{c.m.}$>177 μb/sr at $\theta_{c.m.}$<8.6° (1979Mi15).
9020[‡] *30*		1[‡]	dσ/d$\Omega_{c.m.}$>122 μb/sr at $\theta_{c.m.}$<8.6° (1979Mi15).
9123[c] *7*			E(level): Other: 9140 *40* (1979Mi15).
9350[c] *13*			
9472[c] *7*		0+1 or 2[‡]	E(level): Other: 9490 *40* (1979Mi15).
9642[c] *8*			E(level): Used for internal energy calibration (2020Kw01).
9670[‡] *20*		1[‡]	dσ/d$\Omega_{c.m.}$>421 μb/sr at $\theta_{c.m.}$<8.6° (1979Mi15).
9750[‡] *50*			
9850[‡] *30*		(2)[‡]	
9970[‡] *40*		(1)[‡]	L: (2 step + l = 1).
10120[‡] *50*			L: (2 step) (1979Mi15).
10270[‡] *30*		(1)[‡]	L: (2 step + l = 1).
10440[‡] *50*		(1)[‡]	L: (2 step + l = 1).
10570[‡] *20*		1[‡]	dσ/d$\Omega_{c.m.}$>306 μb/sr at $\theta_{c.m.}$<8.6° (1979Mi15).
10750[‡] *40*		(2)[‡]	L: (2 step + l = 2).
10920 *70*		[‡]	
11030 *60*		[‡]	

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^{24}Mg(p,d),(pol p,d) 1986Mi01,1979Mi15,2020Kw01 (continued)

^{23}Mg Levels (continued)

E(level)†	L†	E(level)†	L†	E(level)†	L†
11210 *60*	‡	11800 *40*	‡	12690 *80*	‡
11380 *60*	‡	11990 *50*	‡	12940 *80*	‡
11540 *60*	‡	12480 *80*	‡	13280 *80*	‡

† From 1986Mi01, except where otherwise noted.
‡ From 1979Mi15.
# From Fig. 1 in 1979Mi15.
@ From Fig. 1 in 1994Ku06. Authors noted uncertainty within 10 keV.
& From 2001Ba17 (p,d) at 16° angle, measured values at 8° angle listed in comments section. 2001Ba17 used ^{24}Mg(p,d) reaction product as calibration standard. 5-keV uncertainty for 8170 and 8197 keV levels assigned by evaluators based on statement listed for 8141 keV level as "error similar to that observed for the other two states" (2001Ba17).
[a] 8180 *30* (1979Mi15) appears to be a doublet of 8170 and 8197.
[b] From vector analyzing power in 1986Mi01, except where otherwise noted.
[c] From 2020Kw01. Spin and parity are based on L − determined from measured $\sigma(\theta)$ and DWBA calculations.
[d] Not presented/listed in Fig/Table, implied in the text and proposed spin and parity in Table 1 (2020Kw01).
[e] C^2S value for 49.2 MeV in column and for 94.8, 150.3 MeV in comments section (1986Mi01).