^{24}Mg(^{3}He,t) 2007Vi16,1995Ku19,1991Gr03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

Other references: 2008Ze05, 2008Vi06, 1993Ku07, 1984Ta11, 1984Va43, 1981Ka18, 1977Pe02, 1977Pe21, 1977Tr04, 1976Pe10.

2007Vi16: E(^{3}He)=30 MeV. Charged particles (tritons) were analyzed using Enge magnetic spectrograph, and detected by a position-sensitive ionization drift chamber. Measured triton spectra at 11°, 17.5°, 21° and 26°. Deduced excited level/resonance energies. 2008Vi06 is another article by the same research group of 2007Vi16. Resolution (FWHM) ≈ 40 keV.

1995Ku19: E(^{3}He)=59.57 MeV. Magnetic spectrograph, tof, ΔE plastic scintillator. Measured $\sigma(\theta)$; deduced levels, spin, parity. Resolution (FWHM) = 50 keV.

1991Gr03: E(^{3}He)=81 MeV. Magnetic spectrograph, E-ΔE detector telescope. Measured σ(E(t),θ(t)), 0° to 30°. Deduced levels, L, spin, parity. DWBA analysis. Resolution (FWHM) = 70 keV.

2008Ze05: E(^{3}He)=420 MeV. Grand Raiden spectrometer. Measured triton spectra, $\sigma(\theta)$. Spectrometer was set at 0° and differential cross sections up to 3° in the center-of-mass system was obtained. Deduced levels, spin, parity, angular momenta, Gamow-Teller strength. Resolution (FWHM)=35 keV.

1977Pe02, 1977Pe21: E(^{3}He)=38.5 MeV. Measured $\sigma(E_t,\theta)$. Deduced levels, spin.

1977Tr04: E(^{3}He)=44 MeV; measured particle spectra. Deduced levels. Resolution (FWHM) = 15 keV.

^{24}Al Levels

E(level)[†]	J$^{\pi}$[c]	L[e]	S[f]	Comments
0	4^{+}	4	8.5	J$^{\pi}$: From Adopted Levels.
431 *5*	1^{+}	0	3.2	E(level): Unweighted average of 422 *10* (2008Ze05), 439 *6* (1991Gr03) and 432 *10* (1995Ku19). Weighted average yields 434 *5*. L: From ΔL=0 (2008Ze05). Other: L=2 (1995Ku19). α^2 = 9.42 *19*, absolute ratio defined in 1976Pe10 as absolute observed cross sections to DWBA predictions using a collective model, represents the strength of a transition with kinematic and Q-value effects removed.
503 *6*	2^{+}	2	2.2	E(level): Unweighted average of 492 *10* (2008Ze05), 511 *6* (1991Gr03) and 506 *10* (1995Ku19). Weighted average yields 508 *5*. ΔL≠0 (2008Ze05).
1109 *3*	1^{+}	0	0.89	E(level): Weighted average of 1090 *10* (2008Ze05), 1111 *3* (1991Gr03) and 1101 *10* (1995Ku19). J$^{\pi}$: L=0 (2008Ze05). 1^{+},2^{+} from $\sigma(\theta)$ and DWBA calculations (1991Gr03). α^2 = 35.2 *70*, absolute ratio defined in 1976Pe10 as absolute observed cross sections to DWBA predictions using a collective model, represents the strength of a transition with kinematic and Q-value effects removed. L: From ΔL=0 (2008Ze05). Other: L=2 (1995Ku19).
1130	(1,2,3)$^{+}$	2		E(level): From 1977Tr04. Confirmed by 1977Pe21. 1977Tr04 report a doublet at 1120 keV separated by about 20 keV. J$^{\pi}$,L: From L=2 (1977Pe21).
1260 *10*	3^{+}	4	0.81	E(level): From 1995Ku19. Other: 1275 *5* (1991Gr03).
1550 *6*	5^{+}	4	1.0,2.2	E(level): Weighted average of 1535 *10* (1995Ku19), 1543 *6* (2007Vi16), 1555 *10* (2008Ze05), and 1563 *7* (2007Vi16). J$^{\pi}$: L=4 gives (4,5,6)$^{+}$ and 2^{+},5^{+} in 1991Gr03.
1618 *5*	3^{+}	4	1.0	E(level): Weighted average of 1619 *10* (2008Ze05), 1619 *6* (2007Vi16) and 1614 *10* (1995Ku19). Other: 1638 *8* (1991Gr03). J$^{\pi}$: Also 3^{+} from $\sigma(\theta)$ and fitting in 2008Ze05.
2346 *6*	(3^{+})	4,(0)	4.4,1.4	E(level): From 2007Vi16. Others: 2349 *10* (2008Ze05), 2328 *10* (1995Ku19), 2369 *4* (1991Gr03). J$^{\pi}$: From 1995Ku19 with the analogue state of ^{24}Na at 2513.3 J$^{\pi}$=3^{+}. 4^{+},5^{+} in 1991Gr03.
2523 *6*	(4^{+},5^{+})	4	2.4,1.0	E(level): Weighted average of 2524 *6* (2007Vi16) and 2521 *10* (1995Ku19). Others: 2546 *7* (1991Gr03). J$^{\pi}$: (4)$^{+}$ in 1995Ku19.
2605[a] *10*	1^{+}[d]	0		J$^{\pi}$,L: From ΔL=0 (2008Ze05).
2805 *10*	2^{+}	2	3.3	E(level): Unweighted average of 2792 *6* (2007Vi16), 2787 *10* (1995Ku19), 2810 *10*

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^{24}Mg(^{3}He,t) 2007Vi16,1995Ku19,1991Gr03 (continued)

^{24}Al Levels (continued)

E(level)[†]	Jπ[c]	L[e]	S[f]	Comments
				(2008Ze05), and 2832 *6* (1991Gr03). Jπ: Also 2+ from σ(θ) and fitting in 2008Ze05.
2878 *6*	(1+)	2	0.71	E(level): Weighted average of 2874 *6* (2007Vi16), 2876 *10* (1995Ku19), 2890 *20* (2008Ze05), and 2920 *23* (1991Gr03).
2978[‡#] *6*	1+[d]	0	0.46,0.2	Jπ: L=0 (2008Ze05) for 3001 *10*. (2+) for 3037 *16* (1991Gr03), identified as a doublet in 2007Vi16. Evaluators assume the level to be the same to that reported in ^{24}Si ε decay (141.3 ms). L: From ΔL=0 (2008Ze05). Other: L=2 (1995Ku19).
3019[‡#] *6*				Jπ: 1+ for 3001 *10* (2008Ze05) and (2+) for 3037 *16* (1991Gr03), identified as a doublet in 2007Vi16.
3236[‡@] *6*		2		Jπ,L: 3+ in 1991Gr03 is questionable as a doublet, 2007Vi16 note.
3269[‡@] *6*		2		Jπ,L: 3+ in 1991Gr03 is questionable as a doublet, 2007Vi16 note.
3332[‡] *6*	(2+)	3,4	2.1	E(level): Others: 3330 *10* (1995Ku19). Although 3384 *16* (1991Gr03) is much higher compared to the E_l in 2007Vi16 and 1995Ku19, and closer to 3375 *10* of 2008Ze05, the L=3,4 indicated to be not the same level of 2008Ze05.
3375[a] *10*	1+[d]	0		Jπ,L: From ΔL=0 (2008Ze05).
3442[‡] *7*	(1+)	(0)		E(level): Others: 3444 *10* (1995Ku19) and 3500 *19* (1991Gr03 − appears to be same level, although spin 2. In (p,n) dataset a 1+ state at 3490). L: From 1995Ku19.
3583[‡] *7*	0+,1+		1.9,0.76	E(level): Others: 3590 *10* (1995Ku19) and 3608 *16* (1991Gr03).
3667[‡] *7*	3+		1.4	E(level): Others: 3674 *10* (1995Ku19), 3691 *10* (2008Ze05), and 3716 *10* (1991Gr03).
3818[‡&] *7*				Jπ: ΔL=1 for 3888 *10* (2008Ze05), may be for a doublet. See footnote. (1+) in 1991Gr03 may be for a doublet (Fig. 5 − poor fitting of σ(θ)).
3858[‡&] *7*				Jπ: ΔL=1 for 3888 *10* (2008Ze05), may be for a doublet. See footnote. (1+) in 1991Gr03 may be for a doublet (Fig. 5 − poor fitting of σ(θ)).
4061 *10*	(1+)		0.95	E(level): From 1995Ku19. Others: 4088 *50* (2008Ze05) and 4057 *17* (1991Gr03).
4129 *24*	2		1.3,0.10	E(level): From 1991Gr03.
4254[‡] *8*	(4,5,6)−	5	1.8,0.15	E(level): Others: 4253 *10* (1995Ku19) and 4301 *31* (1991Gr03). Jπ: From L=5 (1995Ku19), 4 in 1991Gr03.
4386 *10*	1+[d]	0		E(level): From 1995Ku19. Others: 4386 *20* (2008Ze05) and 4397 *8* (2007Vi16). Jπ,L: From ΔL=0 (2008Ze05).
4448 *9*	3+		1.2	E(level): Weighted average of 4445 *10* (1995Ku19), 4426 *20* (2008Ze05), and 4454 *9* (2007Vi16). Uncertainty is the lowest input value. Other: 4485 *10* (1991Gr03).
4711 *10*	1+[d]	0		Jπ,L: From ΔL=0 (2008Ze05). E(level): Weighted average of 4709 *10* (1995Ku19), 4686 *20* (2008Ze05), and 4720 *10* (2007Vi16). Uncertainty is the lowest input value.
4760 *10*	(4+)		3.3,10.5	E(level): Weighted average of 4734 *20* (2008Ze05) and 4764 *8* (1991Gr03).
4848 *10*				E(level): From 1995Ku19.
4991 *33*				E(level): Weighted average of 4971 *20* (2008Ze05) and 5045 *33* (1991Gr03).
5313 *14*	(1+)		2.2	E(level): Unweighted average of 5289 *10* (1995Ku19), 5312 *20* (2008Ze05), and 5337 *10* (1991Gr03).
5461 *16*	6−	5	0.5	E(level): Unweighted average of 5429 *10* (1995Ku19), 5483 *20* (2008Ze05), and 5470 *17* (1991Gr03). Jπ: Proposed in 1991Gr03, based on measured σ(θ) and DWBA calculations, however, could not distinguish clearly from a 5+ distribution.
5531[b] *19*	(1+,2−)			
5614[b] *22*			2.2,0.15	
5714 *10*	(1+,2−)		3.2,0.14	E(level): Weighted average of 5722 *10* (1995Ku19), 5692 *20* (2008Ze05), and 5692 *26* (1991Gr03).
5843 *16*	(1+,2−)		4.0,0.44	E(level): Weighted average of 5848 *10* (1995Ku19) and 5788 *34* (1991Gr03). Other: 5848 (1981Ka18).
5899 *16*	(3+)		1.3	E(level): Weighted average of 5869 *30* (2008Ze05) and 5908 *16* (1991Gr03). Other: 5929

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^{24}Mg(^{3}He,t) 2007Vi16,1995Ku19,1991Gr03 (continued)

^{24}Al Levels (continued)

E(level)[†]	J^{π}[c]	L[e]	S[f]	Comments
				(1981Ka18).
5996 *20*	(2$^+$)		3.5,2.1	E(level): Weighted average of 5952 *30* (2008Ze05) and 6005 *14* (1991Gr03).
6164 *16*	(3$^+$)		1.0	E(level): Weighted average of 6141 *30* (2008Ze05) and 6170 *16* (1991Gr03). Uncertainty is the lower input.
6214[a] *30*				
6324[b] *48*				
6459 *24*	(2)		1.6,0.10	E(level): Weighted average of 6454 *30* (2008Ze05) and 6462 *24* (1991Gr03). Uncertainty is the lower input.
6554[b] *15*	(2$^+$)		3.3,1.7	
6697[b] *19*	(3$^+$)		0.83	
6797[b] *23*	(3$^+$)		0.90	
6878[a] *30*	1$^+$[d]	0		J^{π},L: From ΔL=0 (2008Ze05).
6910 *30*	(1$^+$,2$^-$)		2.6,0.11	E(level): Weighted average of 6896 *30* (2008Ze05) and 6925 *32* (1991Gr03). Uncertainty is the lower input.
7086[b] *8*	(4)		17.6	
7360[b] *3*	(1$^+$,2$^-$)		1.8,0.08	
7441[b] *18*				
7679[b] *20*	(1$^+$,2$^-$)		3.2,0.12	

† 1995Ku19 level energies are consistently lower than that in 1991Gr03. In many cases the values of 2007Vi16 and 2008Ze05 are in between the values reported in 1995Ku19 and 1991Gr03. Listed values chosen based on statistical agreement and/or adopted level energies, if from γ depopulation. Sometimes 2007Vi16 values are preferred as it resolved a few doublets of earlier data. In a few cases the difference is large, no clue if those are same or different levels.

‡ From 2007Vi16.

2007Vi16 propose 3002 *10* (1995Ku19) and 3037 *16* (1991Gr03) to be a doublet, probably applies to 3001 *10* (2008Ze05) as well.

@ 2007Vi16 propose 3247 *10* (1995Ku19) and 3291 *12* (1991Gr03) to be a doublet, probably applies to 3292 *10* (2008Ze05) as well.

& 2007Vi16 propose 3860 *10* (1995Ku19) and 3911 *6* (1991Gr03) to be a doublet, probably applies to 3888 *10* (2008Ze05) as well.

a From 2008Ze05.

b From 1991Gr03.

c Proposed in 1991Gr03 based on measured $\sigma(\theta)$, DWBA analysis, and shell model calculations/wavefunctions, except where otherwise noted.

d No excitation of the isobaric analog state (ΔL=0, ΔS=0) is expected for a ^{24}Mg target (N=Z) in (^{3}He,t).

e From 1995Ku19, except where otherwise noted. Additional values not adopted due to poor energy match.

f $[(d\sigma/d\Omega)exp/ (d\sigma/d\Omega)calc]^{1/2}$ (1991Gr03).