

$^{24}\text{Mg}(\text{p},\text{t})$ 2009Ma68,2009Ch28,2001Ba17

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 127, 69(2015)	1-Apr-2015

Other references: 2002Mi31,2003Mi21,2003Da36,1972Pa02.

$J^\pi(^{24}\text{Mg})=0^+$.

2009Ma68: 99.8% enriched self-supporting ^{24}Mg target, thickness 0.82 mg/cm². Projectile: proton, E=98.7 MeV. Grand Raiden magnetic spectrometer, detection system consisted of two multi-wire drift chambers followed by three scintillation detectors. Measured: triton spectra, FWHM=13 keV, at -0.3° , 8° and 17° . Deduced ^{22}Mg resonance levels. DWBA analysis of $\sigma(\theta)$ data.

2009Ch28: Proton beams of E=41- and 41.5-MeV impinged a target of 99.9% enriched ^{24}Mg (thickness – 500 $\mu\text{g}/\text{cm}^2$), tritons were measured using a large area annular silicon detector array (SIDAR), consisting of ΔE and E detectors and arranged in a lampshade configuration. Measured tritons, angular distributions. DWBA analysis. Deduced ^{22}Mg resonance levels.

2001Ba17: $^{24}\text{Mg}(\text{p},\text{t})$ E=37.925 MeV. QDD spectrometer, measured $\sigma(\theta)$. Deduced excitation energies.

2002Mi31,2003Mi21: $^{24}\text{Mg}(\text{p},\text{t})$ E=34.68 MeV. Magnetic spectrograph, $\sigma(E,\theta)$.

2003Da36: $^1\text{H}(^{24}\text{Mg},\text{t})$ E=55 MeV/nucleon, in inverse kinematics. Magnetic spectrometer, measured proton decay branch, resonance strength.

1972Pa02: $^{24}\text{Mg}(\text{p},\text{t})$ E=40-45 MeV.

 ^{22}Mg Levels

E(level) [†]	J^π &	L [#]	Comments
0.0		0	
1247.02 [‡] 3		2	E(level): 1247.18 3 (2005Se02) for calibration in 2009Ma68.
3308.22 [‡] 6			E(level): 3308.21 6 (2005Se02) for calibration in 2009Ma68.
4402.0 [‡] 3	+c	(2)	
5035.4 [‡] 5	+c	(2)	
5088.7@ 17			E(level): Other value: 5092 5 (2009Ma68).
5293.7@ 16	+c		E(level): Other value: 5294.7 23 (2009Ma68).
5451.9@ 16	+c		
5711.4 [‡] 7	+c	2	E(level): 5711.0 10 (2005Se02) for calibration in 2009Ma68. $\Gamma_p/\Gamma < 0.20$ (2003Da36).
5953.8 8	+c	0	$\Gamma_p/\Gamma = 0.98$ 1 (2003Da36).
6036.2 8	+c	0	E(level): 6041.3 30 (Revised value of 2001Ba17 in 2009Ma68). J^π : 1972Pa02 and 2002Mi31 assign $J^\pi=0^+$, 2003Da36 assign (1^-) , $[3^-]$ from mirror analogy with ^{22}Ne nucleus in 2009Ma68. $\Gamma_p/\Gamma = 0.97$ 3 (2003Da36).
6226.1 10			E(level): 6241 5 (Revised value of 2001Ba17 in 2009Ma68 – a doublet). L: 2009Ma68 propose L=6 in (2002Mi31,2003Mi21) reported for a doublet at 6242 keV, corresponds to 6254 keV level.
6317@ 6		4	
6578 7			
6606@ 7			E(level): Possible doublet (2001Ba17).
6768.8 12			E(level): Other values: 6830 11 (2003Mi21), 6780 14 (Revised value of 2001Ba17 in 2009Ma68).
6876.0 12			
7027 9	[3 ⁺]		
7045 7	[4 ⁺]		
7060 7			
7079 8	[1 ⁻]		
7218.3 10			E(level): Other value: 7260 40 (1972Pa02).
7338 13	[2 ⁺]		
7389 12			
7599.5 29			
7741.1 20			

Continued on next page (footnotes at end of table)

$^{24}\text{Mg}(\text{p,t})$ [2009Ma68](#),[2009Ch28](#),[2001Ba17](#) (continued) ^{22}Mg Levels (continued)

E(level) [†]	J ^π &	Comments
7920.6 15	2 ⁺ ^a	E(level): Other values: 7960 50 (1972Pa02), 7967 3 (2009Ch28).
8007.0 14	[3 ⁻]	
8180.3 17	[2 ⁺]	
8383 13	[2 ⁺]	
8519.3 21	[3 ⁻] ^a	E(level),J ^π : Other value: 8495 4 (2009Ch28), spin parity from 2009Ma68 . Earlier assignment 2 ⁺ in 2009Ch28 noted as doubtful in 2014Zh05 ($^{21}\text{Na,P}$).
8572 6	[4 ⁺] ^b	
8657.5 17	[0 ⁺] ^b	
8743 14	[4 ⁺]	
8784.5 23	[1 ⁻]	J ^π : negative parity from mirror analogy, J=1 is assumed in 2009Ma68 .
8933.1 29	[2 ⁺]	
9082 7	[1 ⁻]	
9157 4	[4 ⁺] ^b	
9315 14	[2 ⁺] ^b	E(level),J ^π : Others: 9544 5 (2009Ch28). J ^π =1 ⁻ in 2009Ch28 .
9492 13	[3 ⁻]	
9546 15	[2 ⁺]	
9700? 50	[0 ⁺]	
9751.6 27	(1 to 2 ⁺) ^a	E(level): Other value: 9773 5 (2009Ch28). J ^π : [2 ⁺] from mirror analogy in 2009Ma68 .
9861 6	[0 ⁺]	
10087 15	[2 ⁺]	
10168? 9	[3 ⁺]	
10271.7 17	[2 ⁺]	E(level),J ^π : Others: 10414 9, spin and parity (1 ⁻) From $\sigma(\theta)$ measurements and DWBA analysis (2009Ch28).
10430 19	[4 ⁺]	
10667 19	[3 ⁻]	
10768 21	[2 ⁺]	
10881 15	[4 ⁺] ^b	E(level),J ^π : Others: 11611 9 (2009Ch28). J ^π =1 ⁻ in (2009Ma68).
10999 15	[0 ⁺]	
11317 27	[4 ⁺] ^b	
11499 17	[2 ⁺]	
11603 16	(3 ⁻ ,4 ⁺) ^a	E(level),J ^π : Others: 11950 8 (2009Ch28). J ^π =0 ⁺ in (2009Ma68).
11760 30	[0 ⁺]	
11937 17	(1 ⁻ ,2 ⁺) ^a	
12220 30	[3 ⁻]	
12474 26	[2 ⁺]	
12665 17	[3 ⁻]	
13010? 50	[0 ⁺]	

[†] From [2009Ma68](#), except otherwise noted. [2001Ba17](#) used calibration energies of 5037.0 14 and 5713.9 keV 12. Present adopted energies for these levels are 5035.4 and 5711.4 keV. Revised level energies are noted in [2009Ma68](#). In [2009Ch28](#), the reported excitation energy and uncertainties are average data from the 16 strips of detector. These data are listed as comments.

[‡] From Adopted Levels, [2009Ma68](#) used for calibration, except noted otherwise.

From [2002Mi31](#), [2003Mi21](#).

@ From [2001Ba17](#), revised value with new calibration data ([2009Ma68](#)).

& Assignments assumed in [2009Ma68](#), except otherwise noted, based on mirror analogy with ^{22}Ne nucleus (Fig. 8).

^a From $\sigma(\theta)$ measurements and DWBA analysis in [2009Ch28](#).

^b Based on theoretical considerations ([2009Ma68](#)).

^c From [2001Ba17](#).