

$^{26}\text{Mg}({}^3\text{He},\alpha),(\text{d},\text{t}),(\text{p},\text{d})$ 1969Jo15,1988Pe19,1984Ki11

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty		NDS 205,1 (2025)	31-May-2025

1969Jo15: (${}^3\text{He},\alpha$) E=15 MeV. 99.42% enriched target; a 61 cm scattering chamber, four or eight silicon surface-barrier detectors placed 18 to 24 cm from the target; measured $\sigma(E,\theta)$; deduced excited levels, L, spectroscopic factor. DWBA calculations. FWHM=not available.

1988Pe19: (${}^3\text{He},\alpha$) E=55.22 MeV, (p,d) E=35 MeV; 99.55% enriched target; magnetic spectrometer; measured $\sigma(\theta)$, $\sigma(E\alpha)$, $\sigma(\text{Ed})$; deduced excited levels, spin, parity, spectroscopic factor. DWBA calculations. FWHM=18 keV in (p,d) and 41 keV in (${}^3\text{He},\alpha$).

1984Ki11: (d,t) E=52 MeV, 99.7% enriched target; four ΔE -E telescopes, each consisting of a stack of four Si surface barrier counters; measured $\sigma(\theta)$, $\sigma(E_t)$; deduced levels, spin, parity, spectroscopic factor. DWBA calculations. FWHM=100 keV.

1971Kr14 (other): (p,d): E=20.0 MeV; >99% enriched target, Si counter telescope; measured $\sigma(\theta)$; deduced excited levels, S. FWHM=30 keV.

Other neutron pickup reactions:

(${}^3\text{He},\alpha$): 1962B114, 1965Fi02, 1967De04, 1967De10, 1969Bo18, 1970De40, 1970Nu01, 1970Mc18, 1973No08.

(d,t): 1960Ha27, 1961Ba10, 1967De10, 1984Ki11.

(p,d): 1981Al01.

(${}^6\text{Li}, {}^7\text{Li}$): 1973Sc26.

(${}^{11}\text{B}, {}^{12}\text{B}$): 1975Pa14.

(${}^{16}\text{O}, {}^{17}\text{O}$): 1976Si05.

 ^{25}Mg Levels

E(level) [†]	J ^π @	L ^a	S ^a	Comments
0	5/2 ⁺	2	2.24	L: also in 1960Ha27, 1961Ba10, 1967De04, 1969Bo18, 1970Mc18, 1970Nu01. S: from (${}^3\text{He},\alpha$) and 2.27 (d,p) (1988Pe19). Others: S=2.5 (${}^3\text{He},\alpha$) and (d,t) (1967De10); 1.9 (1969Jo15); 1.56 and 1.82 (1970Mc18); 1.4 and 2.3 (1970Nu01); 2.28 (p,d) (1971Kr14); 2.50 (${}^{16}\text{O}, {}^{17}\text{O}$) 1976Si05; 2.00, 2.28, and 2.78 (p,d) (1981Al01). C ² S=2.00 (1975Pa14 – (${}^{11}\text{B}, {}^{12}\text{B}$)); C ² S _{rel} =1.00 (1969Bo18); C ² S=3.98 (d,t) (1984Ki11).
586 [#]	1/2 ⁺	0	0.07	L: also in 1960Ha27, 1961Ba10, 1970Mc18, 1970Nu01, 1971Kr14 (p,d). S: others: S=0.17 (${}^3\text{He},\alpha$) and 0.18 (d,t) (1967De10); 0.17 and 0.23 (1970Mc18); 0.093 and 0.15 (1970Nu01); 0.13 (p,d) (1971Kr14); 0.13 (${}^{16}\text{O}, {}^{17}\text{O}$) (1976Si05); 0.28, 0.23, and 0.17 (p,d) (1981Al01); C ² S=0.20 (d,t) (1984Ki11).
975	3/2 ⁺	2	0.07	E(level): other: 972 8 (1984Ki11). L: also in 1960Ha27, 1970Mc18, 1970Nu01. S: others: S=0.11 (${}^3\text{He},\alpha$) and 0.12 (d,t) (1967De10); (0.31) and (0.52) (1970Mc18); 0.059, 0.16, 0.098 and 0.26 (1970Nu01); 0.06 (p,d) (1971Kr14); 0.06, 0.07, and 0.07 (p,d) (1981Al01); C ² S=0.11 (d,t) (1984Ki11).
1612 [#]	7/2 ⁺	4	0.25	E(level): strongly populated in (${}^3\text{He},\alpha$) (1967De04). L: from 1960Ha27, 1967De04, 1970Mc18, 1970Nu01 – L=(4). S: from (${}^3\text{He},\alpha$) and <0.24 (d,t) (1967De10); 0.16 and 0.25 (1970Mc18); 0.140, 0.058, 0.230, and 0.096 (1970Nu01); 0.29 (p,d) (1971Kr14); 0.20 and 0.22 (p,d) (1981Al01).
1965 [#]	5/2 ⁺	2	0.09	E(level): other: 1965 10 (1988Pe19). L: also in 1960Ha27, 1970Mc18, 1970Nu01. S: others: 0.066 from (${}^3\text{He},\alpha$) and 0.11 (p,d) (1988Pe19); 0.14 (${}^3\text{He},\alpha$) and 0.24 (d,t) (1967De10); 0.21 and 0.23 (1970Mc18); 0.076, 0.13, 0.125 and 0.21 (1970Nu01); 0.15 (p,d) (1971Kr14); 0.12, 0.14, and 0.18 (p,d) (1981Al01). C ² S=0.23 (d,t) (1984Ki11).
2561 [#]	1/2 ⁺	0	0.04	L: also in 1960Ha27. S: other: 0.04 (d,t) (1967De10), 0.077 (p,d) (1971Kr14); 0.08 and 0.06 (p,d) (1981Al01). C ² S=0.12 (d,t) (1984Ki11).
2740	7/2		0.19	J ^π : listed for the S value in 1971Kr14. S: from (p,d) (1971Kr14) for J=7/2. Others: 0.07 and 0.06 (p,d) (1981Al01).

Continued on next page (footnotes at end of table)

$^{26}\text{Mg}(^3\text{He},\alpha),(\text{d},\text{t}),(\text{p},\text{d})$ **1969Jo15,1988Pe19,1984Ki11 (continued)** ^{25}Mg Levels (continued)

E(level) [†]	J ^π @	L ^a	S ^a	Comments
2801 [#] 5	3/2 ⁺	(2)	(0.13)	L: from 1960Ha27. Other: (2) for 2740+2803 doublet (1969Jo15). S: for 2740+2803 doublet (1969Jo15). Others: 0.24 (³ He,α) and 0.21 (d,t) (1967De10), 0.24 (¹⁶ O, ¹⁷ O) (1976Si05); 0.16 and 0.15 (p,d) (1981Al01). C ² S=0.35 (d,t) (1984Ki11).
3399	9/2 ⁺	4		E(level),L: for doublet (1967De04). S≤0.075 (³ He,α), <0.67 (d,t) (1967De10), <0.3 (p,d) (1971Kr14) for unresolved doublet.
3413	3/2 ⁻			E(level): from 1967De10. Other: 3410 20 (1984Ki11). J ^π : from Adopted Levels. S≤0.075 (³ He,α) (1967De10); <0.22 and <0.29 (p,d) (1981Al01). C ² S=0.07 (d,t) (1984Ki11).
3908 [‡] 10	5/2 ⁺ &	(2)	(0.18)	J ^π : other: (5/2 ⁺) in 1967De10. L,S: For doublet (1969Jo15). Others: S=0.19 (³ He,α) and 0.28 (d,t) (1967De10); 0.22 (p,d) (1971Kr14); 0.08 and 0.10 (p,d) (1981Al01).
3971 [‡] 10	7/2 ⁻ &		0.012	E(level): other: 3962 10 (1984Ki11: 3926 10 is listed on the same row in Table 3 with 7/2 ⁻ and 3971, this is probably a typo for 3662, otherwise 3926 10 is closer to the 3908 keV level). J ^π : other:(7/2 ⁻) in 1969Jo15. S: from (³ He,α) and 0.022 from (p,d) (1988Pe19). Others: (0.18) for doublet (1969Jo15); <0.2 (³ He,α) and 0.4 (d,t) (1967De10); 0.07 and 0.06 (p,d) (1981Al01). C ² S=0.18 (d,t) (1984Ki11).
4060	9/2 ⁺			E(level),J ^π : from 1981Al01. S: 0.07 and 0.08 (p,d) for 9/2 ⁺ (1981Al01).
4277	1/2 ⁻			E(level),J ^π : from 1981Al01, spin-parity listed for the S value. S: 0.004 and 0.002 (p,d) for 1/2 ⁻ (1981Al01).
4351 [#] 15	3/2 ⁺	2	0.08	J ^π : used for the S value in 1981Al01. S: other: 0.03 (p,d) for 3/2 ⁺ (1981Al01). C ² S=0.09 (d,t) (1984Ki11).
4728 [#] 5	5/2 ⁺ , 3/2, 1/2	2	0.21	J ^π : 5/2 ⁺ from 1967De10, 3/2 and 1/2 from 1984Ki11, listed for the S value. others: S=0.17 (³ He,α) and 0.73 (d,t) for 5/2 ⁺ (1967De10); C ² S=0.30 for 3/2 and 0.34 for 1/2 (d,t) (1984Ki11).
5118 [#] 5	(1/2, 3/2) ⁻ #			E(level): others: 5110 (1967De10), 5080 50 (1969Jo15), 5150 (1976Si05). S=0.32 (³ He,α) and 0.16 (d,t) for 1/2 ⁻ (1967De10); S=0.50 for 1/2 ⁻ and 0.26 for 3/2 ⁻ (1976Si05). C ² S=0.87 for 3/2 and 1.06 for 1/2 (d,t) (1984Ki11).
5473 [#] 8	1/2		0.08	J ^π : used for the S value in 1984Ki11. S: from 1984Ki11 for 1/2.
5794	7/2 ⁻	(3)	0.004	E(level),L,S: from 1988Pe19. Spectroscopic strength from (p,d) for 7/2 ⁻ . Measured σ(θ) did not fit well for L=3. J ^π : used for the S value in 1988Pe19.
5866 [#] 20	5/2 ⁺ #		0.032	E(level): other: 5858 (1988Pe19). S: from (³ He,α) and 0.031 from (p,d) (1988Pe19). Other: C ² S=0.12 (d,t) (1984Ki11).
6092 [#] 10	5/2 ⁺ &	2	0.12	E(level): others: 6083 (1988Pe19), 6080 10 (1969Bo18), 6080 50 (1969Jo15). L: from 1969Bo18. S: from (³ He,α) and 0.11 from (p,d) (1988Pe19). Others: C ² S _{rel} =0.26 (1969Bo18); C ² S=0.73 for 3/2 and 0.49 for 5/2 (d,t) (1984Ki11).
6466 [#] 10	(1/2, 3/2) ⁻ #		0.70	E(level): other: 6460 50 (1969Jo15). S: 0.70 for 3/2 ⁻ and 0.82 for 1/2 ⁻ (d,t) (1984Ki11).
6790 [#] 10	1/2 ⁺		0.19	S: spectroscopic factor for 2S _{1/2} (d,t) (1984Ki11).
6840 50				
6919	7/2 ⁻	3	0.013	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 7/2 ⁻ . L,J ^π : L=3 (p,d) 1988Pe19. Authors propose 7/2 ⁻ based on σ(θ) and DWBA calculations. 5/2 ⁻ in the Adopted Levels.

Continued on next page (footnotes at end of table)

$^{26}\text{Mg}(^3\text{He},\alpha),(\text{d,t}),(\text{p,d})$ **1969Jo15,1988Pe19,1984Ki11** (continued) ^{25}Mg Levels (continued)

E(level) [†]	J ^π [@]	L ^a	S ^a	Comments
6951	7/2 ⁻	3	0.013	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 7/2 ⁻ . L,J ^π : L=3 (p,d) 1988Pe19. Authors propose 7/2 ⁻ based on $\sigma(\theta)$ and DWBA calculations. 5/2 ⁻ in the Adopted Levels.
7084	5/2 ⁺		0.0095	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 5/2 ⁺ . J ^π : used for the S value in 1988Pe19.
7222	5/2 ⁺		0.0064	E(level),S: from 1988Pe19. Spectroscopic strength from (p,d) for 5/2 ⁺ . J ^π : used for the S value in 1988Pe19.
7282 7	7/2 ⁻ &		0.010	E(level): other: 7283 (1988Pe19). S: from (³ He,α) and 0.032 from (p,d) (1988Pe19).
7782 7	5/2 ⁺	2 ^b	1.2	E(level): other: 7790 (1967De10), 7788 (1984Ki11 – calibration points), 7820 10 (1969Bo18), 7820 50 (1969Jo15). S: from 1967De10. Others: S=1.95 (1984Ki11), 1.5 (1969Jo15), C ² S=0.77 (1970De40), C ² S _{rel} =0.54 (1969Bo18).
7863 7	5/2		1.21	J ^π : used for the S values in 1988Pe19. S: from (³ He,α) and 3.50 from (p,d) for 5/2 (1988Pe19). Others: S=(0.09) (1970De40), 1.15 (1976Si05).
8791 7	1/2 ⁺	0 ^b		C ² S=0.079 (1970De40).
8831 [#] 20	1/2 ⁺		0.24	J ^π : used for the S value in 1984Ki11. S: for 1/2 ⁺ (d,t) (1984Ki11).
10618 8	3/2 ⁺ ,5/2 ⁺	2 ^b		C ² S=0.1 (1970De40).
11725 5	1/2 ⁻	1 ^b	0.79	E(level): other: 11705 30 (1984Ki11). J ^π : also assignment in 1984Ki11. S: from 1984Ki11. Other: C ² S=0.27 (1970De40).
11747 10		(1) ^b		C ² S=(0.15) (1970De40).
11775 10		(1) ^b		C ² S=(0.02) (1970De40).
12898 10	3/2 ⁻ ,1/2 ⁻	1 ^b	0.45	E(level): other: 12856 30 (1984Ki11). J ^π : 3/2 ⁻ assigned in 1984Ki11. S: from (d,t) for 3/2 (1984Ki11). Other: C ² S=0.155 and (0.18) (1970De40).

[†] From 1969Jo15 for levels below 7 MeV and from 1970De40 for levels above 7 MeV, except where otherwise noted.

[‡] From 1988Pe19.

[#] From 1984Ki11.

[@] From 1967De10, based on $\sigma(\theta)$, DWBA, and spectroscopic factor calculations, except otherwise noted.

& From 1988Pe19, based on $\sigma(\theta)$, DWBA, and spectroscopic factor calculations.

^a From 1969Jo15, except where otherwise noted.

^b From 1970De40.