$^{24}\text{Mg}(\alpha,\gamma)$ **1978Ma23,1964We02,1995Br16**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 114, 1189 (2013)	1-Apr-2013

Others: 1962Sm07, 1968Me04, 1969Ly04, 1969Sn01, 1972Je04, 1972MaZU, 1978Ci03, 1979Ik02, 1978So10, 1982Cs01, 1982Fr04, 1983Ku01, 1984Bo36, 1986Ma20, 1986Sk01, 2008St11.

1978Ma23: $^{24}\text{Mg}(\alpha,\gamma)$, E= 1.5-3.8 MeV; measured $\sigma(E)$, $\sigma(E_\gamma,\theta)$, deduced resonances, J^π, δ, isospin, γ-ray branching, resonance strength.

1964We02: $^{24}\text{Mg}(\alpha,\gamma)$, $^{28}\text{Si}(\alpha,\alpha)$ E=12.7-13.7 MeV.

1995Br16: 99.84% enriched ^{24}Mg target, E=1.5- and 4-MeV; NaI(Tl) and two HPGe detectors; measured $E\gamma$, γ-ray branching, deduced ^{28}Si resonance levels. Also studied: $^{27}\text{Al}(p,\gamma)$, E=1.097-4.492 MeV, and $^{27}\text{Al}(d,n\gamma)$, E=4-6 MeV.

Presented data are mostly from 1978Ma23 (α,γ) and 1964We02 $(\alpha,\gamma),(\alpha,\alpha)$, except otherwise noted.

^{28}Si Levels

E(level)[†]	J^{π}[&]	Γ	S	Comments
0.0			0.0019 6	
1779.030[@] 11				
4617.86[@] 4				
4979.92[@] 8				
6690.74[@] 15				
6878.79[@] 8				
7380.59[@] 9				
7416.26[@] 9				
10514.1[‡#]				E_α=618 keV.
10805.5[‡#]				E_α=959 keV.
10883.5[‡#]				E_α=1049 keV.
10916[‡]				E_α=1087 keV.
10944[‡]				E(level): Typo as 10994 in table I & II in 2008St11. E_α=1120 keV.
10953[‡]				E_α=1130 keV.
10994[‡]				E_α=1178 keV.
11079[‡]				E_α=1277 keV.
11142[‡]				E_α=1351 keV.
11148 7				E_α=1358 keV 7. E(level): Assumed to be the same level at 11142 keV.
11195[‡]				E_α=1413 keV.
11295.6 2	1^-	<0.15 keV	0.11 2	E_α=1530.03 keV 15.
11515.5 2	2^+	<0.20 keV	0.06 1	E_α=1786.6 keV 2.
11584.0 2	3^-	<0.20 keV	0.04 1	E_α=1866.47 keV 2.
11656.9 3	2^+	<0.20 keV	0.14 3	E_α=1951.6 keV 3.
11669.7 2	1^-	<0.20 keV	0.33 7	E_α=1966.46 keV 19.
11778.7 2	2^+	<0.20 keV	0.03 1	E_α=2093.6 keV 2.
11899.9 2	$(2^+,3^-,4^+)$	<0.20 keV	0.006 1	E_α=2235.1 keV 2.
11975.4 2	$(2^+,3^-,4^+)$	<0.25 keV	0.10 2	E_α=2323.1 keV 2.
12022.7 2	5^-	<0.25 keV	0.08 2	E_α=2378.3 keV 2.
12071.4 3	2^+	<0.25 keV	0.36 8	E_α=2435.1 keV 3.
12182.0 3	1^-	<0.25 keV	0.10 2	E_α=2564.2 keV 3.
12194.2 3	3^-	<0.25 keV	0.19 4	E_α=2578.4 keV 3.
12240.9 3	4^+	<0.25 keV	0.50 11	E_α=2632.9 keV 3.

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^{24}Mg(α,γ)   **1978Ma23,1964We02,1995Br16 (continued)**

^{28}Si Levels (continued)

E(level)[†]	J$^{\pi}$[&]	Γ	S	Comments
12289.9 _3_	2$^+$	<0.25 keV	0.09 _2_	E$_\alpha$=2690.1 keV _3_.
12301.0 _3_	(1$^-$,2$^+$)	<0.25 keV	0.020 _5_	E$_\alpha$=2703.0 keV _3_.
12440.5 _3_	2$^+$	<0.30 keV	1.0 _2_	E$_\alpha$=2865.8 keV _3_.
12474.6 _3_	4$^+$	<0.30 keV	1.5 _3_	E$_\alpha$=2905.5 keV _3_.
12488.2 _4_	3$^-$	<0.30 keV	0.20 _7_	E$_\alpha$=2921.4 keV _4_.
12550.8 _3_	4$^+$	<0.30 keV	0.7 _2_	E$_\alpha$=2994.4 keV _3_.
12725.5 _3_	2$^+$	0.6[a] keV _2_	3.6 _7_	E$_\alpha$=3198.3 keV _3_.
12805.3 _4_	(1$^-$,2$^+$)	<0.35 keV	0.21 _5_	E$_\alpha$=3291.4 keV _4_.
12815.4 _5_	1$^-$	3.5[a] keV _10_	0.20 _4_	E$_\alpha$=3303.1 keV _5_.
12854.6 _3_	4$^+$	<0.35 keV	1.1 _3_	E$_\alpha$=3348.9 keV _3_.
12859.1 _3_	6$^+$,(4$^+$)	<0.35 keV	0.6 _1_	E$_\alpha$=3354.1 keV _3_. J$^{\pi}$: L=6 in (α,γ) in 1995Br16.
12899.9 _3_	2$^+$	1.3[a] keV _4_	2.4 _5_	E$_\alpha$=3401.7 keV _3_. J$^{\pi}$: (4$^+$) in Adopted Level.
12901.3 _10_		<0.35 keV	(0.5) _3_	E$_\alpha$=3403.3 keV _10_.
12923.5 _3_	(2$^+$,3$^-$,4$^+$)	<0.35 keV	0.4 _2_	E$_\alpha$=3429.3 keV _3_.
12972.5 _4_	1$^-$	1.7[a] keV _5_	0.8 _2_	E$_\alpha$=3486.4 keV _4_.
12976 _2_	0$^+$	5.2[a] keV _16_		E$_\alpha$=3490 keV _2_. J$^{\pi}$: From 1982Cs01, based on the γ-ray angular distribution measurements.
13039.8 _5_	0$^+$	3.2[a] keV _10_	0.30 _7_	T=0,1 E$_\alpha$=3564.9 keV _5_.
13093.6 _4_	4$^+$	<0.35 keV	0.9 _2_	E$_\alpha$=3627.7 keV _4_.
13105.9 _4_	2$^+$	<0.35 keV	2.1 _5_	E$_\alpha$=3642.1 keV _4_.
13121.3 _25_		<0.35 keV		E$_\alpha$=3660.0 keV _25_.
13230.3 _15_	2$^+$	<0.4 keV	1.0 _6_	E$_\alpha$=3787.2 keV _15_.
13234 _2_	0$^+$	3.0 keV _9_	1.3 _3_	E$_\alpha$=3792 keV _2_.
13248 _3_	3$^-$	12 keV _4_	0.20 _9_	E$_\alpha$=3808 keV _3_.
13361 _3_	3$^-$		0.23 _6_	E$_\alpha$=3940 keV _3_.
13420 _3_	2$^+$		0.37 _9_	E$_\alpha$=4008 keV _3_.
13489 _3_				E$_\alpha$=4089 keV _3_.
13591 _4_	(4$^+$,5$^-$,6$^+$)		0.7 _2_	E$_\alpha$=4208 keV _4_.
13638 _4_	2$^+$	4.5 keV _14_	0.09 _3_	E$_\alpha$=4263 keV _4_.
13678 _4_	2$^+$	1.9 keV _6_	1.1 _3_	E$_\alpha$=4309 keV _4_.
13708 _4_	(3$^-$,4$^+$)		0.8 _2_	E$_\alpha$=4344 keV _4_.
13816 _4_	1$^-$	11 keV _3_	0.3 _1_	E$_\alpha$=4471 keV _4_. S: For doublet.
13835 _4_	3$^-$	0.9 keV _3_	0.3 _1_	E$_\alpha$=4493 keV _4_. S: For doublet.
13876 _4_	3$^-$	20 keV _6_	0.8 _3_	E$_\alpha$=4541 keV _4_.
13897 _4_	1$^-$	5.4 keV _16_		E$_\alpha$=4565 keV _4_.
13946 _5_	2$^+$	6.2 keV _19_	(0.06) _3_	E$_\alpha$=4622 keV _5_.
13975 _5_	4$^+$	1.3 keV _4_	1.2 _3_	E$_\alpha$=4656 keV _5_. S: For doublet.
13979 _5_	2$^+$	4.5 keV _14_	1.2 _3_	E$_\alpha$=4661 keV _5_. S: For doublet.
14026 _5_				E$_\alpha$=4716 keV _5_.
14063 _5_	2$^+$	6 keV _2_	0.8 _3_	E$_\alpha$=4759 keV _5_. S: For doublet.
14089 _5_	3$^-$	3.7 keV _11_	0.8 _3_	E$_\alpha$=4789 keV _5_. S: For doublet.
14248 _5_				E$_\alpha$=4975 keV _5_.
14308 _5_	2$^+$		2.0 _6_	E$_\alpha$=5045 keV _5_.
14338 _5_				E$_\alpha$=5080 keV _5_.
15226 _3_	0$^+$	0.32 keV _4_	1.2 _4_	T=2

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^{24}Mg(α,γ)　　**1978Ma23,1964We02,1995Br16 (continued)**

^{28}Si Levels (continued)

E(level)[†]	J$^{\pi}$[&]	Γ	S	Comments
				E_α=6115 keV *3*.
				E(level): Measured γ-ray decay branch from this T=2 state (0^+) to levels at 11445-, 10901-, 10724-, and 10598-keV as 40%, 43%, 9%, and 8%, respectively, in 1972Je04.
				Γ: From 1979Ik02.

[†] Deduced using E_α and Q_α(28SI)=9984.14 keV *1*, except otherwise noted. Quoted E_α is in lab energy.

[‡] From 2008St11.

[#] Possible resonances (2008St11).

[@] From Adopted Levels.

[&] Up to 13230 keV level from 1962Sm07 and 1978Ma23, assignments above this level are from 1982Cs01, except otherwise noted. J$^{\pi}$ assignments are based on γ-ray decay and angular distribution measurements.

[a] From 1982Cs01.

$\gamma(^{28}$Si)

E_i(level)	E_γ[†]	I_γ[‡]	E_f	E_i(level)	J$^{\pi}_i$	E_γ[†]	I_γ[‡]	E_f
10994	9212	15 *3*	1779.030	11295.6	1^-	4416	3.0 *10*	6878.79
	10990	85 *8*	0.0			4604	2.2 *10*	6690.74
11142	3725	14 *2*	7416.26			6314	2.5 *10*	4979.92
	3761	32 *3*	7380.59			9513	19 *2*	1779.030
	6523	10 *1*	4617.86			11291	73 *5*	0.0
	9360	44 *4*	1779.030					

[†] Calculated from level energy differences. Recoil energy subtracted.

[‡] From 2008St11.

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Level Scheme

Intensities: % photon branching from each level

$^{28}_{14}$Si$_{14}$