

$^{24}\text{Mg}(\alpha, \alpha' \gamma)$ 1971Ha32, 1969Ca18

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

Others: 1973Br33, 1968Ro05, 2013Ga49 – $^{24}\text{Mg}(\text{d}, \text{d}\gamma)$.

1971Ha32: $^{24}\text{Mg}(\alpha, \alpha' \gamma)$ E=22 MeV; surface-barrier detector, Ge(Li) detector; measured $\alpha, \alpha\gamma$ coincidence; deduce mean lifetime by Doppler Shift Attenuation Method.

1969Ca18: $^{24}\text{Mg}(\alpha, \alpha' \gamma)$ E=22 MeV; natural ^{24}Mg evaporated on Au foil (thickness 0.3 mg/cm²); NaI(Tl), annular Si solid-state detector. Measured scatter $\alpha, \alpha\gamma$ coincidence, $\gamma(\theta)$. Deduced spin and parity.

 ^{24}Mg Levels

E(level)	J^π	$T_{1/2}^\dagger$	Comments
0	0 ⁺		
1369	2 ⁺	1.56 ps 6	$T_{1/2}$: From $\tau=2.25$ ps 9 (1973Br33). Other: $T_{1/2}=1.00$ ps +8–6 from $\tau=1.44$ ps +11–9 (1968Ro05 – also reported $\tau=2.15$ ps ^{85–51} and 1.67 ps ^{51–28}).
4120	4 ⁺	35 fs +23–19	$T_{1/2}$: From $\tau=51$ fs +33–28 (1968Ro05). Other: $T_{1/2}=117$ fs 24 from $\tau=169$ fs 34 (1971Ha32).
4230	2 ⁺	70 fs 17	$T_{1/2}$: From $\tau=101$ fs 25 (1968Ro05). Other: $T_{1/2}=128$ fs 23 from $\tau=185$ fs 33 (1971Ha32).
5236 3		88 fs 32	$T_{1/2}$: From $\tau=127$ fs 46: weighted average of 79 fs +47–51 (1968Ro05) and 173 fs 46 (1971Ha32).
6010		78 fs 15	$T_{1/2}$: From $\tau=112$ fs 22: weighted average of $\tau=71$ fs +37–40 (1968Ro05) and 124 fs 20 (1971Ha32).
6432	0 ⁺	167 fs +17–12	E(level), J^π : From Adopted Levels. $T_{1/2}$: From $\tau=241$ fs +25–17 (1968Ro05).
8440	1 ⁻		J^π : From $\gamma(\theta)$ measurements and fitting (1969Ca18).
9000	1 ⁻ , 2 ⁺		J^π : For doublet, from $\gamma(\theta)$ measurements and fitting (1969Ca18).
9150	1 ⁻ , 2 ⁺		J^π : For doublet, from $\gamma(\theta)$ measurements and fitting (1969Ca18).

[†] From 1971Ha32 (Doppler Shift Attenuation Method), except where otherwise noted. Mean lifetime τ values are listed in comments.

 $\gamma(^{24}\text{Mg})$

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult.	Comments
1369	2 ⁺	1370		0	0 ⁺		
4120	4 ⁺	2750		1369	2 ⁺		
4230	2 ⁺	2860	23	1369	2 ⁺		
		4230	77	0	0 ⁺		I_γ : 73 in Fig. 7 (1971Ha32) – probably a typo.
5236		1110	<2	4120	4 ⁺		E_γ : Weaker transition and not reported in other studies. Not adopted.
		3866	100	1369	2 ⁺		
		5230	<2	0	0 ⁺		
6010		1780	4.5	4230	2 ⁺		
		1890	4.5	4120	4 ⁺		
		4640	91	1369	2 ⁺		
8440	1 ⁻	8438		0	0 ⁺	D	Mult.: From $\gamma(\theta)$ measurements (1969Ca18).
9000	1 ⁻ , 2 ⁺	8998		0	0 ⁺		
9150	1 ⁻ , 2 ⁺	9148		0	0 ⁺		

[†] From level energy difference and recoil energy subtracted. Value rounded to nearest keV.

[‡] From 1971Ha32.

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Level Scheme

Intensities: % photon branching from each level

