

$^{66}\text{Zn}(\alpha, p\gamma)$ **1974Ha09**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 207,1 (2026)	1-Apr-2023

 $(\alpha, p\gamma)$:

1974Ha09: Gamma ray decays of the states in ^{69}Ga were studied using alphas with $E\alpha=12.2$ and 14.2 MeV incident on ^{66}Zn target. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$, $p\gamma$ coincidences, $\gamma(\theta)$, γ -ray and p yields.

1974Iv03: $E\alpha=13$ MeV from IAP cyclotron at Bucharest, Romania bombarded a Ga target. Gammas detected at 90° using a Ge(Li) detector with FWHM=3.5 keV at 1.33 MeV, in coincidence with the charged particles detected at $\theta=\pm 120^\circ$ and $\theta=\pm 50^\circ$, respectively. Measured $E\gamma$, $p\gamma$ coincidences and $T_{1/2}$ by DSA.

1970Bu23: $E\alpha=16.4, 19.4$ MeV. Gammas were detected with Li drifted Si detectors. Measured $\sigma(\theta)$, $\theta=20^\circ-100^\circ$.

 ^{69}Ga Levels

E(level) [†]	J^π [‡]	$T_{1/2}$ [#]	L [@]	Comments
0.0	$3/2^-$		1	
318.30 26	$1/2^-$		1	J^π : 1/2 from the yield function of 318 γ and p yield (1974Ha09).
574.10 21	$5/2^-$	>90 fs	3	J^π : 5/2 from the yield function of 574 γ and p yield (1974Ha09).
871.91 30	$3/2^-$			J^π : 3/2 from the yield function of 872 γ and p yield (1974Ha09).
1027.8 16	$1/2^-$	<0.11 ps		Additional information 1.
				E(level): from 1974Iv03 . Not reported by 1974Ha09 .
1106.25 24	$5/2^-$	0.4 ps 3		J^π : 5/2 from the yield function of 1106 γ and p yield (1974Ha09).
1336.32 22	$7/2^-$	0.6 ps 4		J^π : 7/2 from the yield function of 1336 γ (1974Ha09).
1487.58 20	$7/2^-$			J^π : 7/2 from the yield function of 1488 γ (1974Ha09).
1764.7 4	$9/2^-$			J^π : 9/2 from $\gamma(\theta)$ and yield function of 1191 γ (1974Ha09).
1972.04 30	$9/2^{(+)}$		4	J^π : $9/2^+$ from $\gamma(\theta)$ and yields of 636 γ and 484 γ (1974Ha09); π from L=4 (1970Bu23).
				L: reported for a level at 1990 90 (1970Bu23).
2650 90			(4)	E(level): unresolved doublet (1970Bu23).
				J^π : Not provided as multiple matches are found in the Adopted Levels.
2717.6 4	$13/2^{(+)}$			J^π : $\gamma(\theta)$ consistent with 9/2 or 13/2. Yield function suggests 9/2 (1974Ha09).

[†] From least-squares fit to $E\gamma$ data by the evaluator, unless otherwise noted.

[‡] From Adopted Levels, except as noted. Supporting arguments from these reaction data are indicated.

[#] From DSA in $p\gamma$ coincidence (**1974Iv03**).

[@] From analysis of $\sigma(\theta)$ (**1970Bu23**).

 $\gamma(^{69}\text{Ga})$

E_γ [†]	I_γ [‡]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [#]	δ [@]	Comments
318.3 3		318.30	$1/2^-$	0.0	$3/2^-$			
381.3 3		1487.58	$7/2^-$	1106.25	$5/2^-$			
484.3 4	38	1972.04	$9/2^{(+)}$	1487.58	$7/2^-$	(E1(+M2))	-0.03 3	
574.3 3		574.10	$5/2^-$	0.0	$3/2^-$			
635.8 3	64	1972.04	$9/2^{(+)}$	1336.32	$7/2^-$	(E1(+M2))	-0.03 3	
709.5		1027.8	$1/2^-$	318.30	$1/2^-$			E_γ : calculated from level energy difference; seen by 1974Iv03 .
745.6 3	68	2717.6	$13/2^{(+)}$	1972.04	$9/2^{(+)}$	(E2+M3)	-0.10 5	δ : for 13/2 to 9/2 transition.
762.4 3		1336.32	$7/2^-$	574.10	$5/2^-$			Mult.: if M2 $T_{1/2}>10$ ns.
871.9 3		871.91	$3/2^-$	0.0	$3/2^-$			E_γ : probable doublet (1974Ha09).
913.5 3		1487.58	$7/2^-$	574.10	$5/2^-$			
1106.2 3		1106.25	$5/2^-$	0.0	$3/2^-$			
1190.6 3	100	1764.7	$9/2^-$	574.10	$5/2^-$	(E2)		δ : $\delta(O/Q)=-0.03$ 3.

Continued on next page (footnotes at end of table)

$^{66}\text{Zn}(\alpha, \text{p}\gamma)$ [1974Ha09](#) (continued) $\gamma(^{69}\text{Ga})$ (continued)

<u>E_γ [†]</u>	<u>$E_i(\text{level})$</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>
1336.2 3	1336.32	7/2 ⁻	0.0	3/2 ⁻
1487.5 3	1487.58	7/2 ⁻	0.0	3/2 ⁻

[†] From [1974Ha09](#), unless otherwise noted.

[‡] At $\theta(\gamma)=90^\circ$, $E\alpha=14.2(?)$ MeV, given only for γ 's from levels which are not populated by ^{69}Ge ε decay ([1974Ha09](#)) uncertainties not given.

From $\gamma(\theta)$ ([1974Ha09](#)) and $\Delta\pi=\text{no}$ from level scheme, unless indicated otherwise.

@ From $\gamma(\theta)$ ([1974Ha09](#)).

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Legend

Level Scheme

Intensities: Relative I_γ

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\bullet$ Coincidence

