

$^{70}\text{Zn}(\alpha, n\gamma)$ 1974Fo12, 1975FoZW

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 158, 1 (2019)	16-May-2019

1974Fo12, 1975FoZW: E=14.2 MeV alpha beam was produced from the 80-cm cyclotron in Stockholm. Targets were 1-2 mg/cm² thick 67.6% enriched self-supporting ^{70}Zn . γ rays were detected with Ge(Li) counters. Measured E_γ , I_γ , $\gamma\gamma$ -coin, $\gamma(\theta, \text{pol})$. Deduced levels, J, π , γ -ray multiplicities, mixing ratios. **1974Fo12** deal with positive-parity and **1975FoZW** with negative-parity levels. Results from **1975FoZW** should be regarded as tentative.

The decay scheme has been constructed mainly from the results of $\gamma\gamma$ -coin measurements in **1974Fo12** and **1975FoZW**.

 ^{73}Ge Levels

E(level) [†]	J π	E(level) [†]	J π	E(level) [†]	J π
0.0	9/2 ⁺ [#]	741.7 ^{‡b}	(7/2 ⁻) ^a	1525.6 ^{‡b}	(11/2 ⁻) ^a
68.90 9	7/2 ⁺ [#]	825.81 10	(13/2 ⁺) ^{&}	1610.31 13	(9/2 ⁺ , 13/2 ⁺) [@]
353.8 ^{‡b}	(5/2 ⁻) ^a	868.11 9	(11/2 ⁺) [@]	1871.61 23	(17/2 ⁺) [@]
659.00 10	(9/2 ⁺) [@]	1130.5 ^{‡b}	(9/2 ⁻) ^a	2004.1 ^{‡b}	(13/2 ⁻) ^a

[†] From a least-squares fit to γ -ray energies, unless otherwise noted.

[‡] From **1975FoZW**.

[#] From Adopted Levels.

[@] J from $\gamma(\theta)$ and yield function and π from model consideration (**1974Fo12**).

[&] Transition to g.s. is Q, combined with results of yield function and linear polarization (**1974Fo12**).

^a From band assignment (**1975FoZW**).

^b Band(A): Band based on (5/2⁻). Band assignment is consistent with similar bands in neighboring nuclides (**1975FoZW**).

 $\gamma(^{73}\text{Ge})$

E_γ [†]	I_γ [†]	$E_i(\text{level})$	J π_i	E_f	J π_f	Mult. [#]	δ [#]	Comments
68.9 1	480	68.90	7/2 ⁺	0.0	9/2 ⁺			E γ : placement is from Adopted Gammas; strong transition in spectrum shown by 1974Fo12 but not assigned or placed.
284.9		353.8	(5/2 ⁻)	68.90	7/2 ⁺			
^x 340.2								E γ : This γ is seen but not assigned to any nuclide by 1974Fo12 . A γ at this energy has been seen and placed as a transition to a level at 13 keV from the 354 level in (n,n' γ) (1990Ko49) and ($^7\text{Li}, 3n\text{p}\gamma$) (2015Su12).
387.9 [‡]		741.7	(7/2 ⁻)	353.8	(5/2 ⁻)			A ₂ =+0.40 3, A ₄ =+0.03 3 (1974Fo12). δ : +0.23 10 or +5.6 13 (1974Fo12). A ₂ =-0.45 2, A ₄ =+0.09 4 (1974Fo12).
659.0 1	38	659.00	(9/2 ⁺)	0.0	9/2 ⁺	D(+Q)	+0.03 11	
742.2 1	23	1610.31	(9/2 ⁺ , 13/2 ⁺)	868.11	(11/2 ⁺)	D+Q		
776.7 [‡]		1130.5	(9/2 ⁻)	353.8	(5/2 ⁻)			$\delta(\text{O/Q})=0.00$ 3 from A ₂ =+0.38 4, A ₄ =-0.14 4 (1974Fo12). A ₂ =+0.42 1, A ₄ =-0.11 4 (1974Fo12). A ₂ =-0.87 1, A ₄ =+0.07 2 (1974Fo12).
783.9 [‡]		1525.6	(11/2 ⁻)	741.7	(7/2 ⁻)			
799.2 1	36	868.11	(11/2 ⁺)	68.90	7/2 ⁺	Q		
825.8 1	100	825.81	(13/2 ⁺)	0.0	9/2 ⁺	Q+O	+0.031 +10-14	
868.1 1	52	868.11	(11/2 ⁺)	0.0	9/2 ⁺	D+Q	-0.67 +8-38	
873.6 [‡]		2004.1	(13/2 ⁻)	1130.5	(9/2 ⁻)			

Continued on next page (footnotes at end of table)

$^{70}\text{Zn}(\alpha, n\gamma)$ **1974Fo12, 1975FoZW (continued)** $\gamma(^{73}\text{Ge})$ (continued)

E_γ [†]	I_γ [†]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [#]	δ [#]	Comments
1045.8 2 (1610.3)	31 <2.3	1871.61 1610.31	(17/2 ⁺) (9/2 ⁺ , 13/2 ⁺)	825.81 0.0	(13/2 ⁺) 9/2 ⁺	Q(+O)	+0.05 5	$A_2=+0.50$ 4, $A_4=-0.17$ 4 (1974Fo12).

[†] From **1974Fo12**, unless otherwise noted.

[‡] Not given in **1975FoZW** and values are from level-energy differences.

[#] From $\gamma(\theta)$ in **1974Fo12**.

^x γ ray not placed in level scheme.

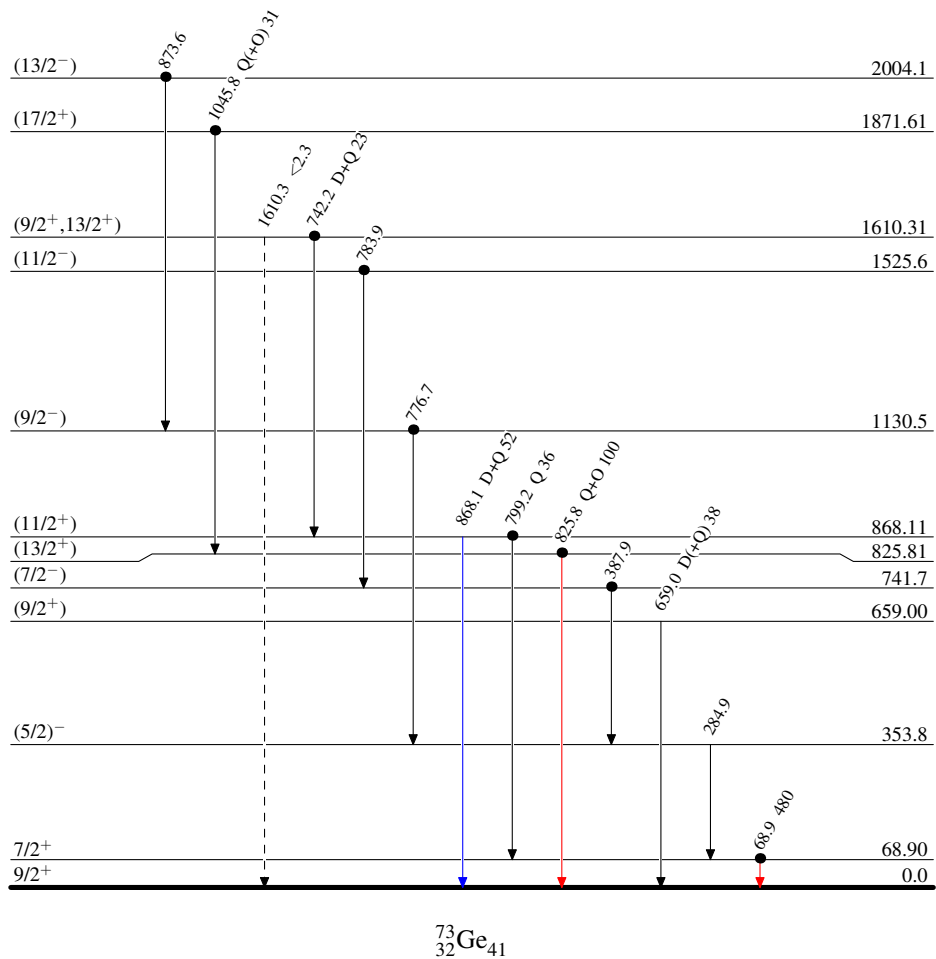
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Level Scheme

Intensities: Relative I_γ

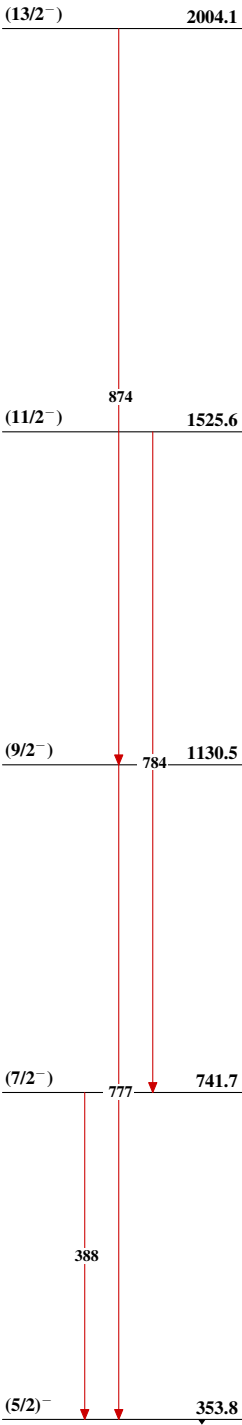
Legend

- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
- - - - -→ γ Decay (Uncertain)
- Coincidence



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Band(A): Band based on $(5/2)^-$



$^{73}_{32}\text{Ge}_{41}$