

$^{64}\text{Zn}(n,\gamma)$ E=thermal 1972Bo75

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 202,59 (2025)	25-Feb-2025

1972Bo75,1977DeYD: measured E_γ , I_γ with a Ge(Li) detector. Deduced levels.

1970Ba21: measured E_γ , I_γ with a Ge(Li) detector at Physics Institute, Ukrainian Academy of Sciences. Deduced levels.

1966Gr12: measured E_γ , I_γ with a magnetic Compton spectrometer. Deduced levels.

(pol n, γ) measurements:

1971Kn06: measured E_γ , γ (circ pol) of primary γ transitions from the capture state. Deduced spins for 116 and 866 levels.

1974DeYS: measured E_γ , γ (circ pol) of primary γ transitions from the capture state. Deduced Q-value, levels, spins for 6 levels polarization. Others: 1956Tr33, 1968Sc02.

Others: 2018Ka38, 2010Di02, measured $\sigma(E_\gamma)$.

 ^{65}Zn Levels

E(level) [†]	J^π [‡]	Comments
0	5/2 ⁻	
53	1/2 ⁻	
116	3/2 ⁻	J^π : 3/2 from γ (circ pol) in 1971Kn06 and 1974DeYS.
207	3/2 ⁻	
770	5/2 ⁻	
866	1/2 ⁻	J^π : 1/2,(3/2) from γ (circ pol) in 1971Kn06, 1/2 from 1974DeYS.
909	3/2 ⁻	J^π : 3/2 from γ (circ pol) in 1974DeYS.
1048	5/2 ⁻	
1468	3/2 ⁻	J^π : 3/2 from γ (circ pol) in 1974DeYS.
1907	1/2 ⁺	
1942	(1/2,3/2)	
2080	(1/2 ⁻ ,3/2 ⁻)	
2202	(1/2,3/2,5/2 ⁺)	J^π : (1/2,3/2,5/2) from γ (circ pol) in 1974DeYS.
2216	(1/2,3/2,5/2 ⁺)	
2419	1/2 ⁻	J^π : 1/2 from γ (circ pol) in 1974DeYS.
2438	(1/2,3/2,5/2 ⁺)	
2458	(1/2,3/2)	
2493	1/2 ⁺	
2573	(1/2,3/2,5/2 ⁺)	
2639?		
2732	(1/2,3/2,5/2 ⁺)	
2996	(1/2,3/2,5/2 ⁺)	
3005?	(3/2 ⁺ ,5/2 ⁺)	
3057	1/2 ⁺	
3109	3/2 ⁺ ,5/2 ⁺	
3150	(1/2 ⁻ ,3/2,5/2 ⁺)	
3192	(1/2,3/2,5/2 ⁺)	
3329	(1/2,3/2,5/2 ⁺)	
3396	(1/2,3/2,5/2 ⁺)	
3468	(3/2 ⁺ ,5/2 ⁺)	
3589	(1/2,3/2,5/2 ⁺)	
3734	(1/2,3/2,5/2 ⁺)	
3815	(1/2,3/2,5/2 ⁺)	
4024	(1/2,3/2,5/2 ⁺)	
4039	(1/2,3/2,5/2 ⁺)	
4393	(1/2,3/2,5/2 ⁺)	
4620	(1/2,3/2,5/2 ⁺)	
4639	(1/2,3/2,5/2 ⁺)	
5547	(1/2,3/2,5/2 ⁺)	
(7979.4 5)	1/2 ⁺	E(level): weighted average of neutron binding energy for ^{65}Zn : 7979.5 7 (1974DeYS) and 7979.2 8

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$^{64}\text{Zn}(n,\gamma)$ E=thermal 1972Bo75 (continued) ^{65}Zn Levels (continued)

<u>E(level)[†]</u>	<u>J^π_i</u>	<u>Comments</u>	
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(1971Ot01).

J^π: from n capture in J^π=0⁺ nucleus.[†] From E_γ data.[‡] From Adopted Levels. Supporting arguments from this data set based on measured circular polarization of primary γ rays are given in comments.γ(^{65}Zn)

<u>E_γ[†]</u>	<u>I_γ^{‡#}</u>	<u>E_i(level)</u>	<u>J^π_i</u>	<u>E_f</u>	<u>J^π_f</u>	<u>Comments</u>
54		53	1/2 ⁻	0	5/2 ⁻	E _γ : rounded value from Adopted Gammas.
115		116	3/2 ⁻	0	5/2 ⁻	
155		207	3/2 ⁻	53	1/2 ⁻	
560	1.1	1468	3/2 ⁻	909	3/2 ⁻	
654	1.7	770	5/2 ⁻	116	3/2 ⁻	
751	11.7	866	1/2 ⁻	116	3/2 ⁻	
770	1.5	770	5/2 ⁻	0	5/2 ⁻	
794	2.4	909	3/2 ⁻	116	3/2 ⁻	
864	1.8	866	1/2 ⁻	0	5/2 ⁻	
909	6.9	909	3/2 ⁻	0	5/2 ⁻	
932	1.4	1048	5/2 ⁻	116	3/2 ⁻	
1260	1.8	1468	3/2 ⁻	207	3/2 ⁻	
1294	2.2	2202	(1/2,3/2,5/2 ⁺)	909	3/2 ⁻	
1350	6.0	1468	3/2 ⁻	116	3/2 ⁻	
1416	1.6	1468	3/2 ⁻	53	1/2 ⁻	
^x 1578	1.2					
1592	1.8	2458	(1/2,3/2)	866	1/2 ⁻	
1826	3.8	1942	(1/2,3/2)	116	3/2 ⁻	
2086	1.7	2202	(1/2,3/2,5/2 ⁺)	116	3/2 ⁻	
2212	2.4	2419	1/2 ⁻	207	3/2 ⁻	
2432	1.26 4	(7979.4)	1/2 ⁺	5547	(1/2,3/2,5/2 ⁺)	
3150	1.0	3150	(1/2 ⁻ ,3/2,5/2 ⁺)	0	5/2 ⁻	
3190	0.9	3396	(1/2,3/2,5/2 ⁺)	207	3/2 ⁻	
3340	0.59 2	(7979.4)	1/2 ⁺	4639	(1/2,3/2,5/2 ⁺)	
3359	0.48 2	(7979.4)	1/2 ⁺	4620	(1/2,3/2,5/2 ⁺)	
3586	0.66 3	(7979.4)	1/2 ⁺	4393	(1/2,3/2,5/2 ⁺)	
3940	0.44 2	(7979.4)	1/2 ⁺	4039	(1/2,3/2,5/2 ⁺)	
3955	0.52 2	(7979.4)	1/2 ⁺	4024	(1/2,3/2,5/2 ⁺)	
4164	1.16 3	(7979.4)	1/2 ⁺	3815	(1/2,3/2,5/2 ⁺)	
4245	0.81 2	(7979.4)	1/2 ⁺	3734	(1/2,3/2,5/2 ⁺)	
4390	0.81 2	(7979.4)	1/2 ⁺	3589	(1/2,3/2,5/2 ⁺)	
4511	0.44 2	(7979.4)	1/2 ⁺	3468	(3/2 ⁺ ,5/2 ⁺)	
4583	1.72 3	(7979.4)	1/2 ⁺	3396	(1/2,3/2,5/2 ⁺)	
4650	0.43 2	(7979.4)	1/2 ⁺	3329	(1/2,3/2,5/2 ⁺)	
4787	0.87 2	(7979.4)	1/2 ⁺	3192	(1/2,3/2,5/2 ⁺)	
4829	2.29 3	(7979.4)	1/2 ⁺	3150	(1/2 ⁻ ,3/2,5/2 ⁺)	
4870	1.29 3	(7979.4)	1/2 ⁺	3109	3/2 ⁺ ,5/2 ⁺	
4922	0.65 2	(7979.4)	1/2 ⁺	3057	1/2 ⁺	
4974 [@]	0.6	(7979.4)	1/2 ⁺	3005?	(3/2 ⁺ ,5/2 ⁺)	From 1972Bo75, not reported in 1977DeYD.
4983	0.57 2	(7979.4)	1/2 ⁺	2996	(1/2,3/2,5/2 ⁺)	
^x 5205	0.3					
5247	0.89 2	(7979.4)	1/2 ⁺	2732	(1/2,3/2,5/2 ⁺)	
5340 [@]	0.5	(7979.4)	1/2 ⁺	2639?		From 1972Bo75, not reported in 1977DeYD.

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$^{64}\text{Zn}(\text{n},\gamma)$ E=thermal 1972Bo75 (continued) $\gamma(^{65}\text{Zn})$ (continued)

E_γ [†]	I_γ [‡] #	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
5406	0.74 2	(7979.4)	$1/2^+$	2573	$(1/2,3/2,5/2^+)$	
5486	0.51 2	(7979.4)	$1/2^+$	2493	$1/2^+$	
5520	1.4	(7979.4)	$1/2^+$	2458	$(1/2,3/2)$	From 1972Bo75, not reported in 1977DeYD.
5541	1.58 3	(7979.4)	$1/2^+$	2438	$(1/2,3/2,5/2^+)$	
5560	3.77 3	(7979.4)	$1/2^+$	2419	$1/2^-$	Circular polarization $R=+0.81$ 23 (1974DeYS).
5762	0.96 2	(7979.4)	$1/2^+$	2216	$(1/2,3/2,5/2^+)$	
5777	4.60 3	(7979.4)	$1/2^+$	2202	$(1/2,3/2,5/2^+)$	Circular polarization $R=+0.99$ 21 (1974DeYS).
5898	0.53 2	(7979.4)	$1/2^+$	2080	$(1/2^-,3/2^-)$	
6037	5.06 4	(7979.4)	$1/2^+$	1942	$(1/2,3/2)$	
6071	0.43 3	(7979.4)	$1/2^+$	1907	$1/2^+$	
6510	4.04 3	(7979.4)	$1/2^+$	1468	$3/2^-$	Circular polarization $R=-0.43$ 20 (1974DeYS).
7069	6.92 5	(7979.4)	$1/2^+$	909	$3/2^-$	Circular polarization $R=-0.17$ 19 (1974DeYS).
7112	6.72 5	(7979.4)	$1/2^+$	866	$1/2^-$	Circular polarization $R=+0.7$ 8 (1971Kn06), $+0.88$ 17 (1974DeYS).
7863	47.8 4	(7979.4)	$1/2^+$	116	$3/2^-$	Circular polarization $R=-0.48$ 16 (1971Kn06), -0.43 5 (1974DeYS).

[†] Primary γ data is from 1977DeYD (uncertainties not available) and secondary γ data is from 1972Bo75 (uncertainties=2-5 keV), except as noted.

[‡] Photons per 100 n captures are given; from 1977DeYD for primary γ rays and from 1972Bo75 (uncertainties not available) for secondary γ rays, except as noted.

Intensity per 100 neutron captures.

@ Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

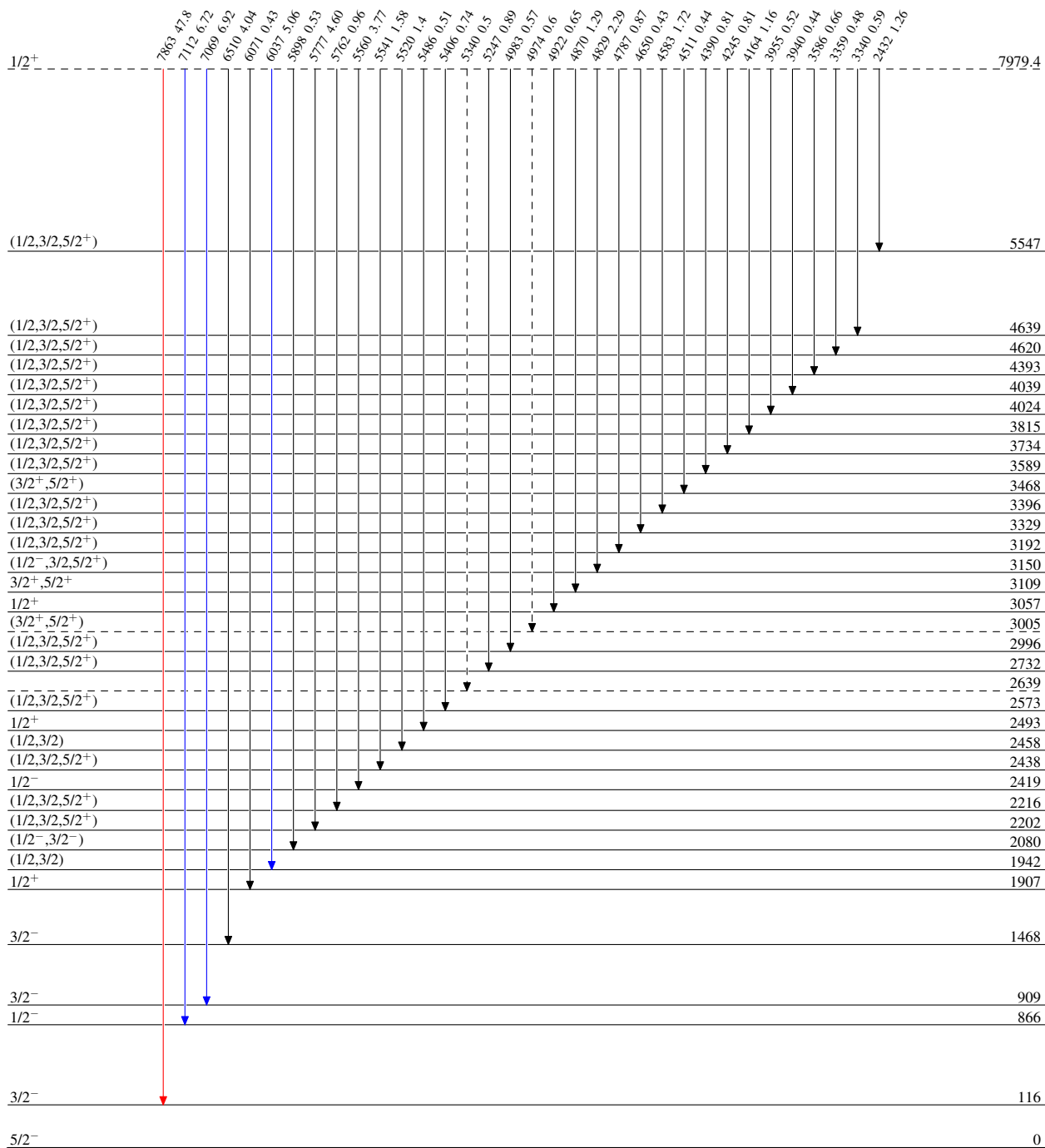
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Legend

Level Scheme

Intensities: photons per 100 N captures

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



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Level Scheme (continued)

Intensities: photons per 100 N captures

Legend

- $\rightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\rightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\rightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$

