^{66}Zn(p,p′γ) 1975An20,1985Pa07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 111, 1093 (2010)	3-Mar-2009

1975An20: E(p)=6.02 MeV; Eγ, Iγ, and p-γ coincidences; Ge(Li).
1963Se02, 1964Se02: E(p)=4.42-5.02 MeV; Eγ, Iγ, γ(θ), and γ excitation functions; NaI detector.
1969Ho33: E(p)=5.5-7.0 MeV; Eγ, γγ coincidences, and γ branchings at θ(γ)=55°; Ge(Li), NaI detectors.
1985Pa07, 1986Pa23: E(p)=5.9-6.9 MeV; Eγ, Iγ, Ice, internal pair production spectrum, γp′ coincidences, $T_{1/2}$. Others: 1961Va25, 1964Sz02, 1965Jo16, 1965Jo17, and 1967Di03.

^{66}Zn Levels

E(level)†‡	Jπ#	$T_{1/2}$	Comments
0.0	0^+		
1039.1 *5*	2^+		Jπ: 2 from γ(θ) (1964Se02).
1873.0 *6*	2^+		Jπ: 2 from γ(θ) (1964Se02).
2372.2 *6*	0^+	<60 ps	Jπ: 0 from γ(θ) (1963Se02). $T_{1/2}$: by centroid shift time measurement (1985Pa07).
2450.1 *7*	4^+		Jπ: (4) from γ(θ) (1964Se02).
2704.1 *10*	(3)		
2765.2 *7*	4^+		
2780.9 *9*	2^+		
2828.1 *7*	3^-		
2941.1 *7*	2^+		
3080.9? *11*	4^+		
3107.0 *8*	0^+		
3214.1 *11*	2^+		
3229.3 *8*	1^+		
3332.0 *10*	2^+		
3381.5 *15*	$1^{(-)}$		
3433.7 *8*	$1^{(-)}$		
3503.1 *12*	2^+		
3522.3 *8*			
3533.1 *16*	0^+		
3575.3 *7*	4^+		
3726.8 *9*			
3739.1 *12*	1		
3752.1 *11*	4^+		
3792.1 *11*	1^+		
3823.1 *16*	0		
3926.4 *9*			
4019.9 *18*	2^+		
4081.0 *16*			
4087.0 *16*	1		
4108.1 *11*			

† From least-squares fit to Eγ data.
‡ Additional information 1.
# From Adopted Levels. Supporting arguments from this reaction are shown here.

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γ(^{66}Zn)

The γ-decay modes of the first few excited states differ noticeably from those reported in the rest of the ^{66}Zn literature, possibly indicating that a number of γ transitions should be considered as tentative.

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	$I_{(\gamma+ce)}$ [#]	Comments
293.0[ba] 5	0.10[b]	3522.3		3229.3	1^+			
293.0[ba] 5	0.10[b]	3726.8		3433.7	$1^{(-)}$			
300.0[ac] 5	0.14	3080.9?	4^+	2780.9	2^+			
315 2	0.10	2765.2	4^+	2450.1	4^+			
380[ac]	≤0.012	2828.1	3^-	2450.1	4^+			E_γ: from 1969Ho33, uncertainty not given. I_γ: calculated from branching ratios (1969Ho33) and Iγ(1789).
500[a] 1	0.41	2372.2	0^+	1873.0	2^+			
834.0 5	39.3	1873.0	2^+	1039.1	2^+	(M1+E2)[@]		δ: +0.8≤δ≤+3.5, from γ(θ) and statistical model, phase convention undefined (1963Se02).
892.0 5	0.65	2765.2	4^+	1873.0	2^+			
908.0 15	0.55	2780.9	2^+	1873.0	2^+			
911[a] 1	0.99	3739.1	1	2828.1	3^-			
955 1	0.37	2828.1	3^-	1873.0	2^+			
962[a] 1	0.94	3726.8		2765.2	4^+			
1039.0 5	100	1039.1	2^+	0.0	0^+	(E2)[@]		
1053[a] 1	0.13	3503.1	2^+	2450.1	4^+			
1062.0 15	0.09	3433.7	$1^{(-)}$	2372.2	0^+			
1150[a] 1	0.20	3522.3		2372.2	0^+			
1160[a] 1	0.27	3926.4		2765.2	4^+			
1203.0[a] 5	0.72	3575.3	4^+	2372.2	0^+			
1234.0 5	1.04	3107.0	0^+	1873.0	2^+			
1239.0 15	0.03	4019.9	2^+	2780.9	2^+			
1333.0 5	5.59	2372.2	0^+	1039.1	2^+	(E2)[@]		
1356 2	0.20	3229.3	1^+	1873.0	2^+			
1411.0 5	4.0	2450.1	4^+	1039.1	2^+	(E2)[@]		
1459 1	0.71	3332.0	2^+	1873.0	2^+			
1508 2	0.18	3381.5	$1^{(-)}$	1873.0	2^+			
1555 1	0.33	3926.4		2372.2	0^+			
1703 1	0.12	3575.3	4^+	1873.0	2^+			
1726 1	0.57	2765.2	4^+	1039.1	2^+			
1742 1	0.83	2780.9	2^+	1039.1	2^+			
1789.0 5	3.56	2828.1	3^-	1039.1	2^+			
1873.5[ac] 10	0.22	1873.0	2^+	0.0	0^+			E_γ: possibly due to the decay of a level at 3747 (1975An20). I_γ: <0.002 from adopted γ transitions.
1902.0 5	2.95	2941.1	2^+	1039.1	2^+			
2067.9 9	0.06	3107.0	0^+	1039.1	2^+			I_γ: from the branching ratio Iγ(1234):Iγ(2066)=0.94 2:0.06 2 (1985Pa07).
2175 1	1.32	3214.1	2^+	1039.1	2^+			
2190 1	1.07	3229.3	1^+	1039.1	2^+			
2208.0[a] 15	0.63	4081.0		1873.0	2^+			
2214.0 15	0.14	4087.0	1	1873.0	2^+			
2293.0 15	0.14	3332.0	2^+	1039.1	2^+			
2372.2 6		2372.2	0^+	0.0	0^+	E0[&]	3.7×10^{-4} 7	$I_{(\gamma+ce)}$: from the E0 pair production branching ratio

Continued on next page (footnotes at end of table)

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γ(^{66}Zn) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	$I_{(\gamma+ce)}$[#]	Comments
								I(e±)(2372γ)/I(1331γ)=5.7×10^{-5} *11* (1985Pa07) and the ce(K)(2372γ)/I(e±)(2372γ)=0.146 from theory (1986PaZM). The K conversion to pair production ratio has been increased by 10% to allow for L conversion. ρ^2(E0)>0.2×10^{-3}; B(E0; 2372γ)/B(E2; 1333γ)=0.047 *8* (1985Pa07).
2394 *1*	0.30	3433.7	1$^{(-)}$	1039.1	2$^+$			
2450[a] *2*	0.08	2450.1	4$^+$	0.0	0$^+$			
2494.0 *15*	0.25	3533.1	0$^+$	1039.1	2$^+$			
2536 *2*	0.30	3575.3	4$^+$	1039.1	2$^+$			
2704[a] *1*	0.08	2704.1	(3)	0.0	0$^+$			
2713 *1*	0.11	3752.1	4$^+$	1039.1	2$^+$			
2753 *1*	0.09	3792.1	1$^+$	1039.1	2$^+$			
2780 *2*	1.29	2780.9	2$^+$	0.0	0$^+$			
2784.0[a] *15*	1.46	3823.1	0	1039.1	2$^+$			
2827[ac]	0.029	2828.1	3$^-$	0.0	0$^+$			E_γ: from 1969Ho33, uncertainty not given. I_γ: calculated from branching ratios (1969Ho33) and Iγ(1789).
2888.0 *15*	0.11	3926.4		1039.1	2$^+$			
3069[a] *1*	0.10	4108.1		1039.1	2$^+$			
3107.0 *8*		3107.0	0$^+$	0.0	0$^+$	E0[&]	2.5×10^{-4} *5*	$I_{(\gamma+ce)}$: from the E0 pair production branching ratio I(e±)(3107γ)/I(1234γ)=2.3×10^{-4} *5* (1985Pa07) and the ce(K)(3107γ)/I(e±)(3107γ)=0.043 from theory (1986PaZM). The K conversion to pair production ratio has been increased by 10% to allow for L conversion. B(E0,3107γ)/B(E2,2068γ)=5.0 *12* (1985Pa07).
3230.0 *15*	0.45	3229.3	1$^+$	0.0	0$^+$			
3382 *2*	0.52	3381.5	1$^{(-)}$	0.0	0$^+$			
3433 *3*	0.9	3433.7	1$^{(-)}$	0.0	0$^+$			

[†] From 1975An20, except as noted. γ transitions not confirmed by any other data are indicated.
[‡] Relative intensity at θ=90° (1975An20). Uncertainties are stated to be ≈2% for the strongest and 20% for the weak γ′s.
[#] Relative intensity.
[@] From γ(θ) (1964Se02) and assigned J^π values.
[&] From internal conversion data and absence of γ ray (1985Pa07).
[a] Not confirmed by any other ^{66}Zn data.
[b] Multiply placed with undivided intensity.
[c] Placement of transition in the level scheme is uncertain.

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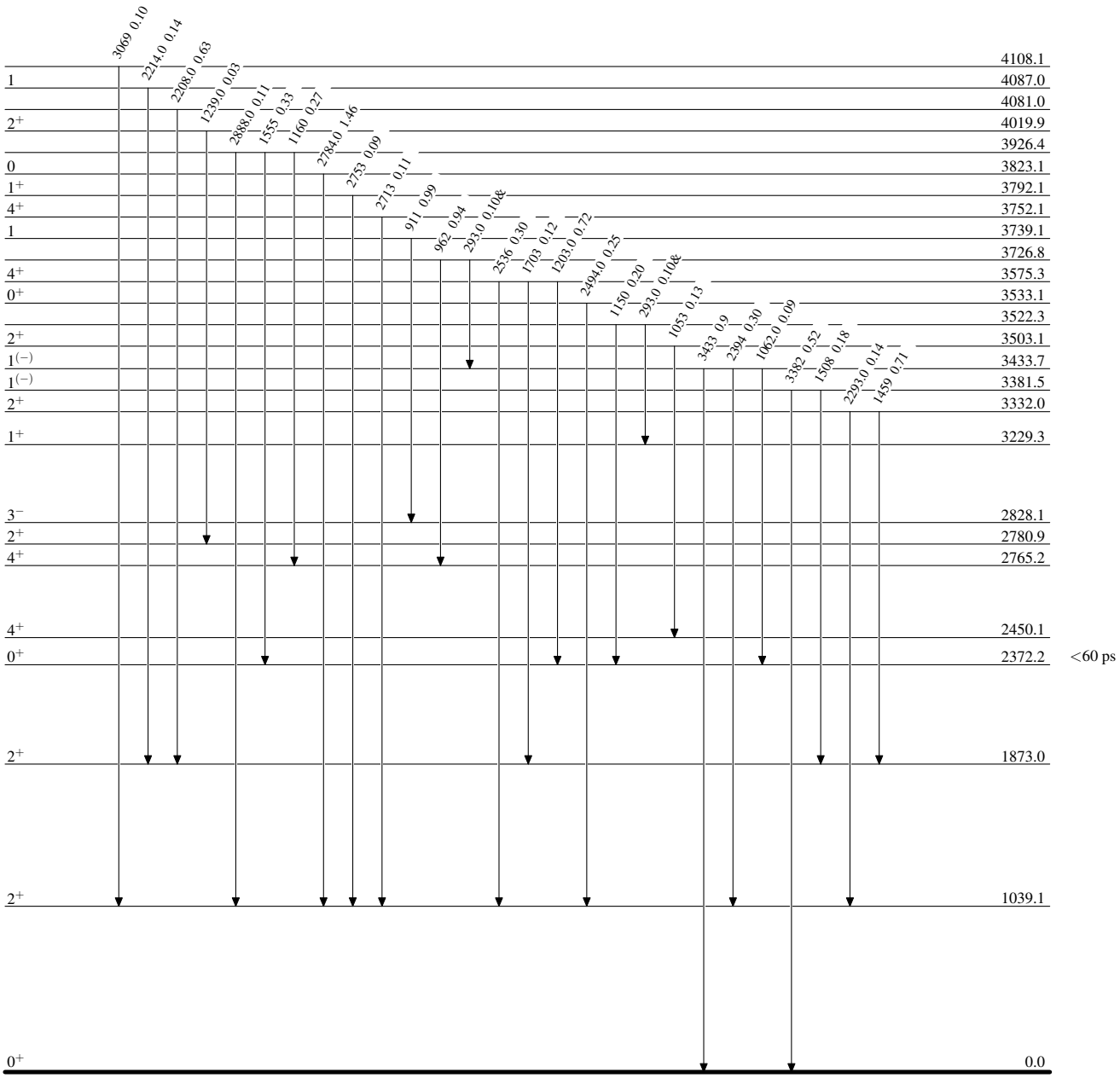
Level Scheme

Intensities: Relative photon intensity At θ=90° (1975An20)
& Multiply placed: undivided intensity given

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



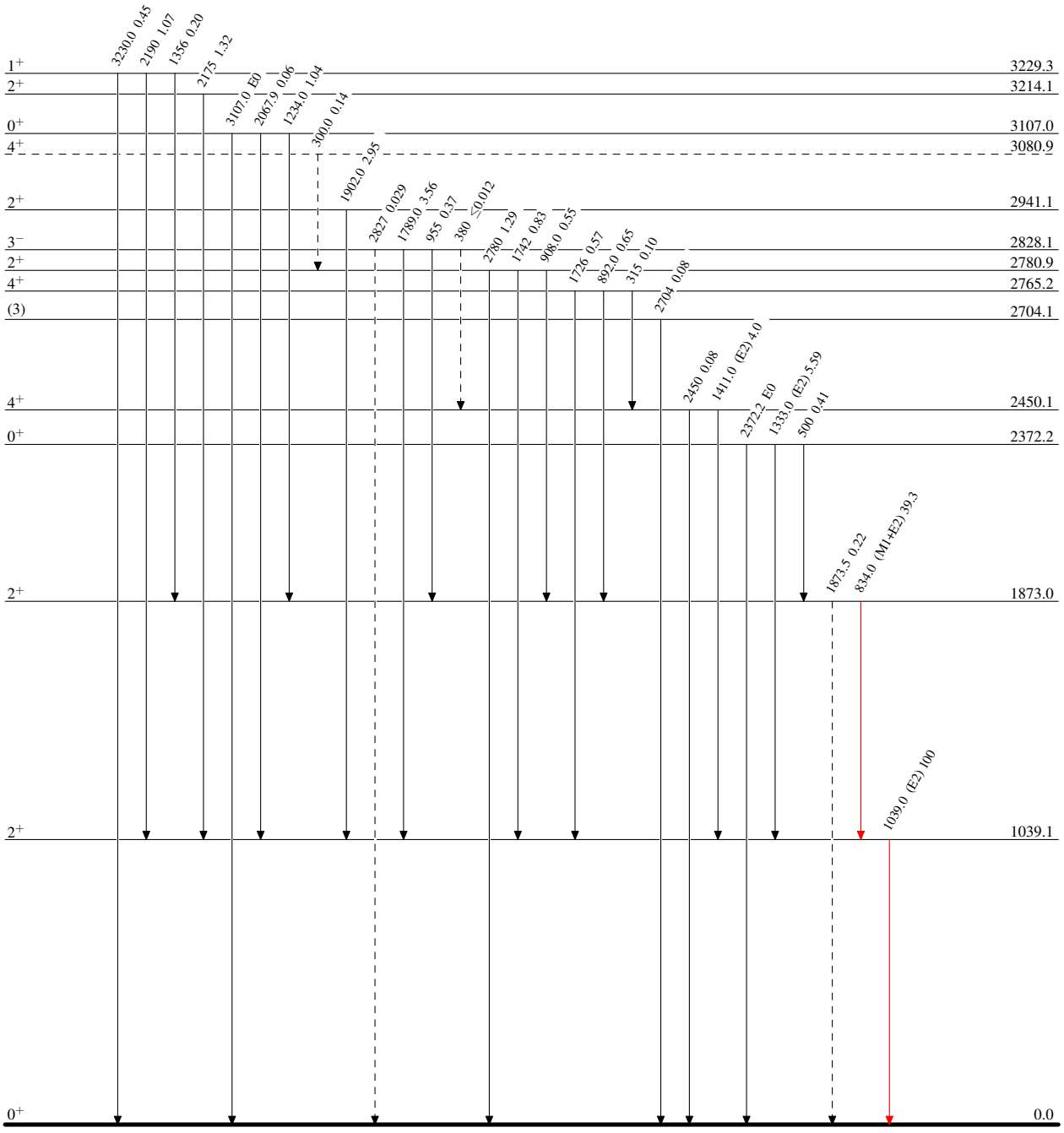
$^{66}_{30}Zn_{36}$

^{66}Zn(p,p′γ) 1975An20,1985Pa07

Level Scheme (continued)

Intensities: Relative photon intensity At θ=90° (1975An20)
& Multiply placed: undivided intensity given

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



$^{66}_{30}Zn_{36}$