

⁷⁹Zn β⁻ decay (0.746 s) 1986Ek01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 135, 193 (2016)	31-May-2016

Parent: ⁷⁹Zn: E=0.0; J^π=9/2⁺; T_{1/2}=0.746 s 42; Q(β⁻)=9115.4 29; %β⁻ decay=100.0

⁷⁹Zn-J^π, T_{1/2}: From ⁷⁹Zn Adopted Levels.

⁷⁹Zn-Q(β⁻): From 2012Wa38.

Measured γ, γγ, βγ, T_{1/2}(⁷⁹Zn). The ⁷⁹Zn isotope produced by mass separation of fission fragments.

Others:

1991Kr15: isotope produced by ²³⁸U(p,X) reaction followed by mass separation. Measured T_{1/2} and %β⁻n.

1988BaZX: production of ⁷⁹Zn isotope.

1981Ru07, 1977Ru09, 1976Ru01, 1974Gr29: production of ⁷⁹Zn by mass separation of fission fragments. Three most intense γ rays at 702, 866 and 874 identified.

⁷⁹Ga Levels

E(level) [†]	J ^π [‡]	Comments
0.0	(3/2 ⁻)	
5.4 2	(5/2 ⁻)	
278.7 2	(7/2 ⁻)	
707.6 2	(7/2 ⁻)	
802.6 2		
871.2 2	(7/2 ⁺)	
962.6 2		
1066.0 4		
1582.2 2		
1616.0 2		
1838.3 5		
1919.5 4		E(level): level is at 1919 or 1807 depending on the ordering of 1100.6γ- 1211.9γ cascade (1986Ek01).
2214.3 5		
2561.5 3		
2649.0 5		
2741.3 3		
2919.7 4		
2977.4 4		
3020.1 4		
3334.8 5		
6913+x		S(n)(⁷⁹ Ga)=6913.0 27 (2012Wa38), x<2202, from Q(β ⁻)(⁷⁹ Zn)-S(n)(⁷⁹ Ga).

[†] From least-squares fit to E_γ values.

[‡] From Adopted Levels.

β⁻ radiations

Due to a gap of about 5800 keV between the highest known level (at 3335) populated in this decay and the Q(β⁻) value (of 9090), β feedings and associated log ft values should be considered as approximate.

E(decay)	E(level)	Iβ ⁻ [†]	Log ft	Comments
(1.1×10 ³ # 11)	6913+x	1.7 5		Iβ ⁻ : %β ⁻ n=1.7 5 (from ⁷⁹ Zn Adopted Levels).
(5781 3)	3334.8	2.2 5	5.9 1	av Eβ=2623.6 15
(6095 3)	3020.1	7.9 7	5.40 5	av Eβ=2776.6 15
				E(decay): 5900 100 from βγ coin.

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⁷⁹Zn β⁻ decay (0.746 s) **1986Ek01 (continued)**

β⁻ radiations (continued)

E(decay)	E(level)	Iβ ^{-†}	Log ft	Comments
(6138 3)	2977.4	4.7 9	5.64 8	av Eβ=2797.2 15
(6196 3)	2919.7	5.6 7	5.58 6	av Eβ=2825.4 15
(6374 3)	2741.3	13 3	5.3 1	E(decay): 5900 40 from βγ coin. av Eβ=2912.1 15
(6466 3)	2649.0	4.0 7	5.81 8	E(decay): 5900 80 from B(1778γ). Other: 6200 90 from B(2034γ). av Eβ=2957.0 15
(6554 3)	2561.5	≤2	≥6.1	av Eβ=2999.5 15 E(decay): 5700 40 from βγ coin.
(6901 3)	2214.3	2.2 7	6.2 2	av Eβ=3168.3 15
(7196 3)	1919.5	1.7 14	6.4 4	av Eβ=3311.7 15
(7277 3)	1838.3	3.1 7	6.2 1	av Eβ=3351.1 15
(7499 3)	1616.0	11 1	5.67 5	av Eβ=3459.2 15 E(decay): 5900 120 from βγ coin.
(7533 3)	1582.2	3.2 16	6.2 2	av Eβ=3475.7 15
(8049 3)	1066.0	5.6 7	6.10 6	av Eβ=3726.6 15 E(decay): 6900 180 from βγ coin.
(8153 [‡] 3)	962.6	<2	>6.6	av Eβ=3776.8 15
(8244 3)	871.2	19 2	5.62 6	av Eβ=3821.3 15
(8313 [‡] 3)	802.6	<1.4	>6.8	av Eβ=3854.6 15
(8408 3)	707.6	7 3	6.1 2	av Eβ=3900.8 15
(8837 3)	278.7	8.4 10	6.12 6	av Eβ=4109.1 15

† Absolute intensity per 100 decays.

‡ Existence of this branch is questionable.

Estimated for a range of levels.

γ(⁷⁹Ga)

I_γ normalization: Σ I_γ (γ rays to g.s. and 5.4)=98.3 5, assuming no β⁻ feeding to g.s. and 5.4 level and %β⁻n=1.7 5 (from ⁷⁹Zn Adopted Levels). log f^{1u}t>8.5 for the 5.4 level leads to Iβ<9%. It should, however, be noted that the known level scheme extends only up to 3335 keV, whereas Q(β⁻)=9115. Thus there could be higher levels populated in this decay which have not been observed as yet.

E _γ	I _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π
^x 226.8 4	3.8 10				
236.2 3	6.6 20	2977.4		2741.3	
^x 256.0 4	7.0 20				
263.4 3	18.0 20	1066.0		802.6	
274.0 6	7.0 15	278.7	(7/2 ⁻)	5.4 (5/2 ⁻)	
278.9 2	33.0 20	278.7	(7/2 ⁻)	0.0 (3/2 ⁻)	
358.2 2	18.1 20	2919.7		2561.5	
415.8 4	8.5 20	2977.4		2561.5	
^x 452.5 3	11.3 15				
653.9 4	16 3	1616.0		962.6	
684.3 3	13.1 15	962.6		278.7 (7/2 ⁻)	
702.20 10	100 3	707.6	(7/2 ⁻)	5.4 (5/2 ⁻)	
707.5 2	32.2 20	707.6	(7/2 ⁻)	0.0 (3/2 ⁻)	
711.4 4	6.4 20	1582.2		871.2 (7/2 ⁺)	
773.3 3	7.2 15	3334.8		2561.5	
797.1 2	19.0 20	802.6		5.4 (5/2 ⁻)	

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$^{79}\text{Zn } \beta^- \text{ decay (0.746 s) } \mathbf{1986\text{Ek01 (continued)}}$ $\gamma(^{79}\text{Ga}) \text{ (continued)}$

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
802.5 2	19.0 20	802.6		0.0	(3/2 ⁻)	1211.9 3	31 4	1919.5		707.6	(7/2 ⁻)
813.3 2	19.3 15	1616.0		802.6		1343.1 4	7.1 20	2214.3		871.2	(7/2 ⁺)
865.80 10	75 3	871.2	(7/2 ⁺)	5.4	(5/2 ⁻)	^x 1573.8 4	7.3 20				
874.4 2	40 4	1582.2		707.6	(7/2 ⁻)	1778.5 4	30 6	2741.3		962.6	
^x 882.6 2	19 3					1941.4 4	12.9 20	2649.0		707.6	(7/2 ⁻)
956.2 5	15 3	962.6		5.4	(5/2 ⁻)	^x 2022.5 5	8.0 20				
962.6 4	16.1 20	962.6		0.0	(3/2 ⁻)	2034.2 5	17 4	2741.3		707.6	(7/2 ⁻)
979.3 2	36.3 20	2561.5		1582.2		^x 2572.1 5	11 3				
1100.6 2	25.4 20	3020.1		1919.5		^x 3935.1 5	12.6 15				
1130.7 4	10.0 20	1838.3		707.6	(7/2 ⁻)						

[†] For absolute intensity per 100 decays, multiply by 0.311 7.





^x γ ray not placed in level scheme.

$^{79}\text{Zn} \beta^-$ decay (0.746 s) 1986Ek01

Decay Scheme

Intensities: I_γ per 100 parent decays

Legend

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

