

⁹⁰Zr(p,p'γ) 1971Ra08,1974Ce03

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, E. A. McCutchan	NDS 165,1 (2020)	1-Mar-2020

1971Ra08: E=3.0-7.2 MeV. Measured E_γ, I_γ, semi, enriched target.
 1974Ce03: E=24 MeV. Measured σ(E(p'),θ), semi, p-γ coin, E_γ, scin.
 Others: 1962Ne02, 1970Am01, 1972Bu18, 1972Pi13, 1974Ch52, 1984Sc37, 2015Ot02.
 Data are from 1971Ra08, except as noted.

⁹⁰Zr Levels

E(level)	J ^π †	T _{1/2}	Comments
0	0 ⁺		
1762 2	0 ⁺	61.3 ns 25	E(level): From 1962Ne02. T _{1/2} : From 1972Bu18.
2186.3 3	2 ⁺		
2318.7 3	5 ⁻		
2738.8 5	(4) ⁻		E(level): For cross section limit on excitation of this level in (p,p'), see 1974Ch52.
2748.0 4	3 ⁻		
3077.3 4	4 ⁺		
3308.8 6	2 ⁺		
3845.0 10	2 ⁺		
4237.9 13	(2 ⁺)		
5510 [‡] 15	1 ⁺ , 1 ⁻ , 2 ⁺ ‡		
5890 [‡] 15	1 ⁻ ‡		
6420 [‡] 15	1 ⁺ , 1 ⁻ , 2 ⁺ ‡		

† From Adopted Levels, except as noted.
 ‡ From 1974Ce03. J^π based on observed Γ_{γ0}/Γ_γ and γ(θ).

γ(⁹⁰Zr)

For measured conversion electron spectrum, see 1972Pi13.
 Probability of two-photon decay for 1762, 0⁺ to 0⁺, transition is 0.018% 2, with a ratio <2E1>/<2M1> of 1.9 0.7 (1984Sc37).

E _γ	I _γ †	E _i (level)	J _i ^π	E _f	J _f ^π	Comments
236.5 [#]		3308.8	2 ⁺	3077.3	4 ⁺	E _γ : From 1972Pi13.
420.1 3		2738.8	(4) ⁻	2318.7	5 ⁻	
561.7 3		2748.0	3 ⁻	2186.3	2 ⁺	
891.0 3		3077.3	4 ⁺	2186.3	2 ⁺	
1122.0 8	26 12	3308.8	2 ⁺	2186.3	2 ⁺	
1762		1762	0 ⁺	0	0 ⁺	α: I(ce)/I(γ)=2.38 8, K/LM=7.06 8 (1962Ne02). E _γ : For excitation function of K-electrons for E(p)=6.0-8.6 MeV, see 1970Co01.
2186.3 3		2186.3	2 ⁺	0	0 ⁺	
2318.7 3		2318.7	5 ⁻	0	0 ⁺	
2477.7 12		4237.9	(2 ⁺)	1762	0 ⁺	
2747.5 10		2748.0	3 ⁻	0	0 ⁺	I _γ : a few percent (1971Ra08).
3309.1 8	74 12	3308.8	2 ⁺	0	0 ⁺	
3844.9 10		3845.0	2 ⁺	0	0 ⁺	
4237.0 15		4237.9	(2 ⁺)	0	0 ⁺	

Continued on next page (footnotes at end of table)

 ${}^{90}\text{Zr}(\text{p},\text{p}'\gamma)$ **1971Ra08,1974Ce03** (continued) $\gamma({}^{90}\text{Zr})$ (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>
5510 [‡]	5510	1 ⁺ ,1 ⁻ ,2 ⁺	0	0 ⁺
5890 [‡]	5890	1 ⁻	0	0 ⁺

[†] Percent photon branching from each level (1970Am01).

[‡] From 1974Ce03.





[#] Placement of transition in the level scheme is uncertain.

$^{90}\text{Zr}(p,p'\gamma)$ 1971Ra08,1974Ce03

Legend

Level Scheme

Intensities: Relative I_γ

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

