

$^{89}\text{Y}(\alpha, \text{p}4\text{n}\gamma)$ 1985Ox01

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan and A. A. Sonzogni		NDS 115, 135 (2014)	1-Nov-2013

$E(\alpha)=42.0$ MeV to 78.2 MeV. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$, excitation functions, and $\gamma(\theta)$ using two Ge and seven NaI detectors.

 ^{88}Zr Levels

$E(\text{level})^\dagger$	$J^\pi^\ddagger$	Comments
0	0^+	
1057.12 10	2^+	
1817.9 4	2^+	
2139.73 14	4^+	
2456.3 6	3^-	
2539.12 16	5^-	
2801.1 6	5^-	
2810.93 16	6^+	
2887.93 19	8^+	
3390.83 21	8^+	
3483.4 3	(7^-)	
3617.1 3	(7^-)	
4413.3 5	10^+	
4487.0 4	(9^-)	
4612.5 4	9^+	
4713.3 4	10^-	
4798.1 4	11^-	
5229.8 5	12^+	
5584.0 5	(12^-)	
5665.1? 6	12^+	J^π : assigned as (13) in 1985Ox01.
5950.7 6	$(13)^+$	
6238.8 6	$(14)^+$	
6498.4 6	$(14)^+$	J^π : assigned as (15^+) in 1985Ox01.
7415.5? 7		J^π : assigned as (16) in 1985Ox01. $E(\text{level})$: not included in Adopted Levels.

† From a least-squares fit to $E\gamma$ by evaluators.

‡ From the Adopted Levels.

 $\gamma(^{88}\text{Zr})$

E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	$\delta^\ddagger$	Comments
77.0 1	18.1 5	2887.93	8^+	2810.93	6^+			
84.7 2	16.5 4	4798.1	11^-	4713.3	10^-	D		Mult.: $A_2=-0.17$ 3.
100.8 2	14.8 6	4713.3	10^-	4612.5	9^+	D		Mult.: $A_2=-0.18$ 3.
226.5 3	4.2 6	4713.3	10^-	4487.0	(9^-)	D(+Q)	-0.03 3	Mult.: $A_2=-0.32$ 3.
259.6 ^{#b}	1 [@]	6498.4	$(14)^+$	6238.8	$(14)^+$			
262 1	2.6 10	2801.1	5^-	2539.12	5^-			Mult.: $A_2=+0.6$ 2.
271.8 1	27 ^a	2810.93	6^+	2539.12	5^-			
288.1 2	7.5 4	6238.8	$(14)^+$	5950.7	$(13)^+$	D+Q	-0.10 5	Mult.: $A_2=-0.43$ 4.
299.8 3	1.4 3	4713.3	10^-	4413.3	10^+			
366.5 ^b 4	1.8 [@]	5950.7	$(13)^+$	5584.0	(12^-)			
385.1 5	3.2 8	4798.1	11^-	4413.3	10^+			
399.4 1	39 1	2539.12	5^-	2139.73	4^+			
435.3 ^b 3	2.3 5	5665.1?	12^+	5229.8	12^+	D		Mult.: $A_2=-0.08$ 18.

Continued on next page (footnotes at end of table)

$^{89}\text{Y}(\alpha, \text{p}4\text{n}\gamma)$ 1985Ox01 (continued) $\gamma(^{88}\text{Zr})$ (continued)

E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	Comments
502.9 1	55 3	3390.83	8 ⁺	2887.93	8 ⁺	D		Mult.: $A_2=+0.43$ 5.
547.7 3	4.3 5	6498.4	(14) ⁺	5950.7	(13) ⁺	(Q)		Mult.: $A_2=+0.22$ 12, $A_4=0$.
638.4 4	1.5 4	2456.3	3 ⁻	1817.9	2 ⁺			
661 1	0.6 3	2801.1	5 ⁻	2139.73	4 ⁺			Mult.: $A_2=-1.2$ 7.
671.2 1	58 1	2810.93	6 ⁺	2139.73	4 ⁺			
672.5 [#]	&	3483.4	(7 ⁻)	2810.93	6 ⁺			
721.1 4	10 1	5950.7	(13) ⁺	5229.8	12 ⁺	D+Q	-0.20 7	Mult.: $A_2=-0.56$ 9.
760.5 5	1.9 8	1817.9	2 ⁺	1057.12	2 ⁺			
785.7 4	3.4 10	5584.0	(12 ⁻)	4798.1	11 ⁻	D+Q	-0.3 1	Mult.: $A_2=-0.74$ 17.
806.2 3	4.1 8	3617.1	(7 ⁻)	2810.93	6 ⁺	(D)		Mult.: $A_2=-0.16$ 20.
815.8 [#]	4.8 ^a	3617.1	(7 ⁻)	2801.1	5 ⁻			
816.6 2	21 1	5229.8	12 ⁺	4413.3	10 ⁺	Q		Mult.: $A_2=+0.35$ 7, $A_4=-0.15$ 8.
917.1 ^b 3	5.3 6	7415.5?		6498.4	(14) ⁺	(D)		Mult.: $A_2=-0.14$ 8.
944.3 3	3.8 6	3483.4	(7 ⁻)	2539.12	5 ⁻			
1003.7 [#]	1.1 ^a	4487.0	(9 ⁻)	3483.4	(7 ⁻)			
1021.5 [#]	35 [@] 5	4413.3	10 ⁺	3390.83	8 ⁺	Q		Mult.: $A_2=+0.3$ 2, $A_4=-0.13$ 26.
1057.1 1	100 1	1057.12	2 ⁺	0	0 ⁺			
1082.6 1	93 1	2139.73	4 ⁺	1057.12	2 ⁺			
1096.3 4	1.2 9	4487.0	(9 ⁻)	3390.83	8 ⁺	(D)		Mult.: $A_2=-0.2$ 6.
1221.6 5	17 2	4612.5	9 ⁺	3390.83	8 ⁺	D+Q	-0.3 2	Mult.: $A_2=-0.7$ 3.
1818.6 8	0.4 4	1817.9	2 ⁺	0	0 ⁺			

[†] Intensity at $E_\alpha=69$ MeV, normalized to $I_\gamma(1057\gamma)=100$.

[‡] From 1985Ox01 based on $\gamma(\theta)$ measurements.

[#] Energy deduced by 1985Ox01 based on level energy differences.

[@] Contamination γ subtracted.

& Weak.

^a Intensity deduced by 1985Ox01 based on known branching ratios from ^{88}Nb β^+ decay.

^b Placement of transition in the level scheme is uncertain.

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Level Scheme

Intensities: Type not specified

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
- Coincidence (Uncertain)

