

⁹⁰Zr(³He,p3n γ) 1982Di09

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114, 1 (2013)	20-Oct-2012

Includes ⁹⁰Zr(p,2n γ).

1982Di09: ⁹⁰Zr(³He,p3n γ) E=43 MeV; ⁹⁰Zr(p,2n γ), E=18-26 MeV; measured γ , $\gamma\gamma$, $\gamma(\theta)$.

⁸⁹Nb Levels

2814 level from 1982Di09 is omitted due to revised placement of 663 γ , as in (HI,xn γ).

E(level) [†]	J π [‡]	E(level) [†]	J π [‡]	E(level) [†]	J π [‡]	E(level) [†]	J π [‡]
0	(9/2 ⁺)	2136.6 3	(15/2)	2728.2 4		3401.3 4	(25/2 ⁺)
658.6 2	(7/2 ⁺)	2150.3 3	(17/2 ⁻)	2935.1 4		3803.1 4	(25/2 ⁻)
1003.6 2	(13/2 ⁺)	2191.9 3	(21/2 ⁺)	2954.7 4	(23/2 ⁺)	4551.7 5	(27/2 ⁻)
1155.0 5		2515.6 4	(21/2 ⁻)	3133.5 4	(19/2 ⁻)		
1935.4 3	(17/2 ⁺)	2523.7 4	(19/2 ⁺)	3140.9 4	(21/2 ⁻)		

[†] From least-squares fit to E γ data.

[‡] From Adopted Levels.

γ (⁸⁹Nb)

E γ	I γ [†]	E _i (level)	J π _i [†]	E _f	J π _f [†]	Mult.	Comments
206.9 1	4.1 4	2935.1		2728.2			A ₂ =+0.21 2, A ₄ =0.
214.9 1	15.3 15	2150.3	(17/2 ⁻)	1935.4	(17/2 ⁺)		A ₂ =+0.46 2, A ₄ =+0.11 5.
256.5 1	37 4	2191.9	(21/2 ⁺)	1935.4	(17/2 ⁺)		A ₂ =+0.30 1, A ₄ =+0.06 4.
331.8 1	7.5 8	2523.7	(19/2 ⁺)	2191.9	(21/2 ⁺)		
365.3 1	6.7 7	2515.6	(21/2 ⁻)	2150.3	(17/2 ⁻)	(Q) [@]	A ₂ =+0.37 5, A ₄ =-0.04 7.
401.8 1	3.8 4	3803.1	(25/2 ⁻)	3401.3	(25/2 ⁺)		A ₂ =+0.34 4, A ₄ =0.
446.6 1	10.0 10	3401.3	(25/2 ⁺)	2954.7	(23/2 ⁺)	D [#]	A ₂ =-0.29 8, A ₄ =+0.03 8.
617.9 2	1.8 2	3133.5	(19/2 ⁻)	2515.6	(21/2 ⁻)	D [#]	A ₂ =-0.29 16, A ₄ =0.
658.6 2	10.2 10	658.6	(7/2 ⁺)	0	(9/2 ⁺)	D [#]	A ₂ =-0.43 3, A ₄ =0.00 4.
663.2 2	3.4 4	3803.1	(25/2 ⁻)	3140.9	(21/2 ⁻)		Placement from (HI,xn γ) (1993Bo33). 1982Di09 suggested 2814-2151. A ₂ =+0.15 7, A ₄ =0.
748.6 2	2.8 3	4551.7	(27/2 ⁻)	3803.1	(25/2 ⁻)	D [#]	A ₂ =-0.39 22, A ₄ =+0.05 26.
762.8 2	12.6 13	2954.7	(23/2 ⁺)	2191.9	(21/2 ⁺)	D+Q [#]	A ₂ =-0.73 3, A ₄ =+0.06 4.
792.8 2	4.0 4	2728.2		1935.4	(17/2 ⁺)		
931.8 2	66 7	1935.4	(17/2 ⁺)	1003.6	(13/2 ⁺)	Q [@]	A ₂ =+0.24 3, A ₄ =-0.14 8.
949.0 2	8.6 9	3140.9	(21/2 ⁻)	2191.9	(21/2 ⁺)		I γ : most of the intensity must be contributed by an impurity. It is observed very weakly in (HI,xn γ) with I γ (949 γ)/I γ (991 γ)=0.014 (1993Bo33).
983.2 2	≤5	3133.5	(19/2 ⁻)	2150.3	(17/2 ⁻)		
990.6 2	6.4 7	3140.9	(21/2 ⁻)	2150.3	(17/2 ⁻)		A ₂ =+0.65 9, A ₄ =+0.08 12.
1003.6 2	100 10	1003.6	(13/2 ⁺)	0	(9/2 ⁺)	Q [@]	A ₂ =+0.37 5, A ₄ =-0.13 7.
1133.0 2	5.5 6	2136.6	(15/2)	1003.6	(13/2 ⁺)	D [#]	A ₂ =-0.33 12, A ₄ =0.
1155.0 [‡] 5		1155.0		0	(9/2 ⁺)		

[†] From (³He,p3n γ) E=43 MeV (1982Di09).

Continued on next page (footnotes at end of table)

 ${}^{90}\text{Zr}({}^3\text{He},\text{p}3\text{n}\gamma)$ **1982Di09** (continued) $\gamma({}^{89}\text{Nb})$ (continued)

‡ Observed only in ${}^{90}\text{Zr}(\text{p},2\text{n}\gamma)$ (**1982Di09**).

$\gamma(\theta)$ is consistent with $\Delta J=1$, mult=dipole or D+Q.

@ $\gamma(\theta)$ is consistent with $\Delta J=2$, Q (most likely E2).

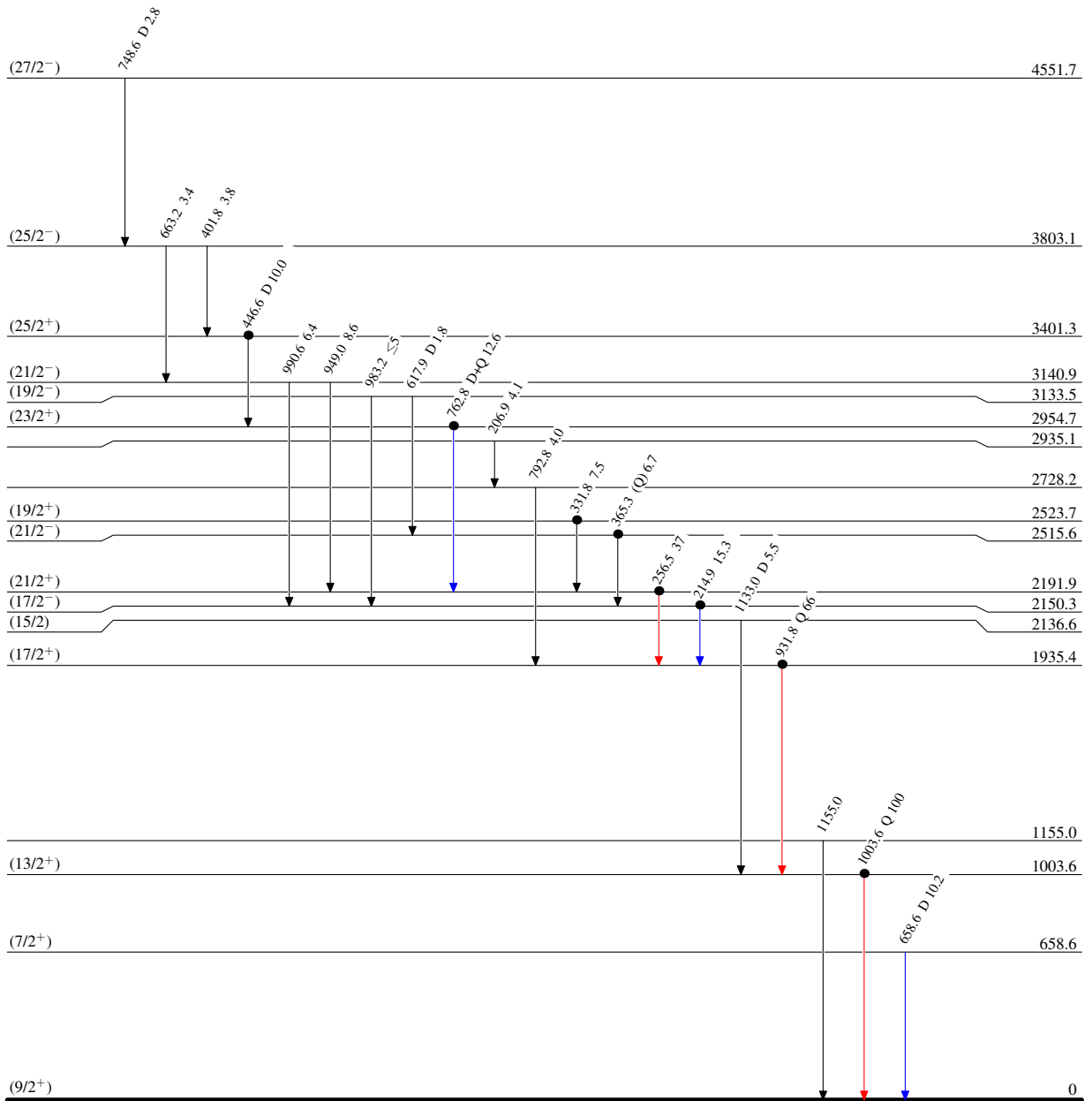
$^{90}\text{Zr}(^3\text{He,p}3\text{n}\gamma)$ 1982Di09

Level Scheme

Intensities: Relative I_γ

Legend

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



$^{89}\text{Nb}_{48}$