

$^{92}\text{Zr}(\text{pol } \gamma, \gamma'), (\gamma, \gamma')$ 2004Fr30, 2002We15

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 113, 2187 (2012)	15-Sep-2012

2004Fr30: E=3.47, 3.64 MeV nearly monoenergetic, 100% linearly polarized beam from high-intensity γ source At Duke free electron LASER laboratory; 95.16% isotopically-enriched ^{92}Zr target; 4 HPGe detectors; measured $E\gamma$, relative nuclear resonance fluorescence intensities, γ asymmetry ratios.

2002We15: 91.4% enriched ^{92}Zr target; ^{27}Al added to target to enable direct measurement of integrated cross section; 3 HPGe detectors; measured (but did not report) integrated cross sections (I_s) for 9 excited states; deduced reduced transition probabilities; shell-model calculations.

 ^{92}Zr Levels

E(Z),J(Z) J^π and rounded energy taken from Adopted Levels.

E(level) [†]	J^π [†]	Comments
0.0	0 ⁺	
934	2 ⁺	
1383	0 ⁺	
1847	2 ⁺	this state exhibits isovector character (2002We15).
3263 <i>I</i>	2 ⁺	
3370 <i>I</i>	1 ⁽⁻⁾	
3471.9	1 ⁺	J^π : M1 3472 γ to 0 ⁺ g.s. (2004Fr30).
3500 <i>I</i>	2 ⁺	
3638.1	1 ⁻	J^π : E1 3638 γ to 0 ⁺ g.s. (2004Fr30).
3667 <i>I</i>	1	
3697 <i>I</i>	1	
3915 <i>I</i>	1	

[†] From 2002We15, except As noted.

 $\gamma(^{92}\text{Zr})$

E_γ [†]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
913	1847	2 ⁺	934	2 ⁺		B(M1)(W.u.)=0.46 15 if pure M1, B(E2)(W.u.)=0.3 1 if pure E2 (2002We15).
1847	1847	2 ⁺	0.0	0 ⁺		if E2, B(E2)(W.u.)=3.7 8 (2002We15); consistent with adopted value.
2089	3471.9	1 ⁺	1383	0 ⁺		if M1, B(M1)(W.u.)=0.08 1 (2002We15) cf. adopted value of 0.052 8.
2255	3638.1	1 ⁻	1383	0 ⁺		
2329	3263	2 ⁺	934	2 ⁺		if M1, B(M1)(W.u.)=0.16 2 (2002We15) cf. adopted value of 0.108 13.
2538	3471.9	1 ⁺	934	2 ⁺		B(M1)(W.u.)<0.089 6 if pure M1, B(E2)<8.0 6 if pure E2 (2002We15); adopted B(E2)(W.u.)=0.063 9.
2763	3697	1	934	2 ⁺		B(M1)(W.u.)<0.036 7 if pure M1, B(E2)<2.8 5 if pure E2 (2002We15). ADOPTED B(M1)(W.u.)=0.011 +31-11.
3263	3263	2 ⁺	0.0	0 ⁺	Q	if E2, B(E2)(W.u.)=1.0 1 (2002We15); consistent with adopted value.
3370	3370	1 ⁽⁻⁾	0.0	0 ⁺	D	if E1, B(E1)(W.u.)=0.000037 4 (2002We15) cf. adopted value of 0.000082 14.
3471.9@	3471.9	1 ⁺	0.0	0 ⁺	M1#	B(M1)(W.u.)=0.094 4 (2002We15) cf. adopted value of 0.063 9. Mult.: R(asymmetry)=+0.94 3 (2004Fr30).
3500	3500	2 ⁺	0.0	0 ⁺	Q	if E2, B(E2)(W.u.)=0.17 1 (2002We15) cf. adopted value of 0.35 4. Additional gammas are known to deexcite this level.
3638.1@	3638.1	1 ⁻	0.0	0 ⁺	E1#	Mult.: R(asymmetry)=-0.87 3 (2004Fr30). if M1, B(M1)(W.u.)=0.093 4 (2002We15); however, γ is now known to be E1.
3667	3667	1	0.0	0 ⁺	D	if pure M1, B(M1)(W.u.)=0.0037 6 (2002We15).

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$^{92}\text{Zr}(\text{pol } \gamma, \gamma'), (\gamma, \gamma')$ 2004Fr30, 2002We15 (continued) $\gamma(^{92}\text{Zr})$ (continued)

E_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
3697	3697	1	0.0	0 ⁺	D	if M1, B(M1)(W.u.)=0.016 2 (2002We15); consistent with adopted value of 0.0127 24.
3915	3915	1	0.0	0 ⁺	D	if M1, B(M1)(W.u.)=0.022 3 (2002We15).

[†] From level energy difference, except As noted. presumably observed by 2002We15, but E_γ not reported.

[‡] Implied by level spin assignment from 2002We15; details of measurement not stated.

[#] From $R(\text{asymmetry}) = (I_{\text{parallel}} - I_{\text{perpendicular}}) / (I_{\text{parallel}} + I_{\text{perpendicular}})$, except as noted; $I_{\text{parallel}} = I(\langle \phi \rangle = 0^\circ) + I(\langle \phi \rangle = 180^\circ)$ and $I_{\text{perpendicular}} = I(\langle \phi \rangle = 90^\circ) + I(\langle \phi \rangle = 270^\circ)$, where ϕ is the azimuthal angle between the polarization plane of the beam and direction of the scattered γ ray (2004Fr30).

[@] From 2004Fr30; uncertainty unstated by authors.

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Level Scheme

