^{176}Yb(^{28}Si,Xγ), ^{176}Yb(^{31}P,Xγ) 2005Pa48

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 112, 1163 (2011)	15-Dec-2010

^{176}Yb(^{28}Si,Xγ): E(^{28}Si)=145 MeV; prompt gammas from fission fragments detected using EUROGAM II detector array (54 escape-suppressed Ge detectors, 30 of which were of large-volume coaxial design and the remaining 24 of the four-element clover type); measured Eγ, Iγ, $\gamma\gamma$ coin.

^{176}Yb(^{31}P,Xγ): E(^{31}P)=152 MeV; EUROBALL IV detector array (15 cluster, 26 clover and 30 tapered single-crystal Ge detectors; each cluster detector was comprised of seven closely-packed, large-volume encapsulated Ge crystals); measured Eγ, Iγ, $\gamma\gamma$ coin.

^{93}Zr Levels

Energy spectra of excited states in ^{93}Zr are well reproduced by 2005Pa48 using spherical shell model and a $\pi(2p_{1/2},1g_{9/2})$, $\nu(2d_{5/2},3s_{1/2})$ space outside a ^{90}Zr core and empirical effective interactions. For detailed configuration assignments to ground and excited states in this nuclide, see the authors' discussion.

E(level)[†]	J$^\pi$[‡]	Comments
0.0	$5/2^+$	
950.4 *3*	$9/2^+$	
2284.9[#] *4*	$(11/2^-)$	J$^\pi$: adopted value is $(13/2^+)$.
2375.2 *4*	$(13/2^-)$	J$^\pi$: adopted value is $(11/2^-)$.
2486.3 *5*	$(15/2^-)$	
2601.4 *6*		
2774.9 *4*		
2990.2 *4*	$(15/2^+)$	J$^\pi$: adopted value is $(15/2^+,17/2^+)$.
3265.4 *5*	$(17/2^+)$	J$^\pi$: adopted value is $(17/2^+,21/2^+)$.
3331.3 *6*	$(19/2^+)$	
3605.2 *6*		
3657.3 *6*	$(21/2^+)$	
4487.1 *7*	$(23/2^+)$	
4717.0 *7*	$(25/2^+)$	
5479.5 *7*		
5488.6 *7*		
6647.3 *8*		
7294.8 *9*		

[†] From least-squares fit to Eγ; ΔEγ=0.3 keV assumed for each transition.

[‡] Authors' tentative assignments based on previously-known J$^\pi$ for some low-spin states, comparison with theoretical calculations and the assumption that yrast J values increase with excitation energy. Assignments are supported by comparison of corresponding states in neighboring Zr isotopes using a weak-coupling scheme.

[#] The ordering of the 705.5γ-1334.6γ cascade here is the reverse of that in ^{173}Yb(^{24}Mg,Fγ) (2002Fo03) and is supported by the fact that the 1335γ is clearly stronger than the 706γ.

γ(^{93}Zr)

Assignment of transitions to ^{93}Zr is based on coincidence of γ rays with known transitions from complementary ^{204}Po binary fission partners, ^{104,105,106}Ru and ^{107,108,109}Rh isotopes, and/or γ rays of ^{93}Zr already known from the literature.

Continued on next page (footnotes at end of table)

^{176}Yb(^{28}Si,Xγ), ^{176}Yb(^{31}P,Xγ) 2005Pa48 (continued)

$\gamma(^{93}Zr)$ (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
65.9		3331.3	$(19/2^+)$	3265.4	$(17/2^+)$	E_γ: unresolved multiplet. $I_{(\gamma+ce)}$: ≤31 *3* from intensity balance At 3265 level, assuming negligible internal conversion for 392γ and 275γ.
111.1	44 *3*	2486.3	$(15/2^-)$	2375.2	$(13/2^-)$	
115.1	19.0 *18*	2601.4		2486.3	$(15/2^-)$	
215.2	5.7 *6*	2990.2	$(15/2^+)$	2774.9		
275.2	43 *3*	3265.4	$(17/2^+)$	2990.2	$(15/2^+)$	
326.0	38.1 *27*	3657.3	$(21/2^+)$	3331.3	$(19/2^+)$	
391.9	12.0 *5*	3657.3	$(21/2^+)$	3265.4	$(17/2^+)$	
503.8	30.3 *24*	2990.2	$(15/2^+)$	2486.3	$(15/2^-)$	
647.5	5.0 *4*	7294.8		6647.3		
705.5	19.8 *19*	2990.2	$(15/2^+)$	2284.9	$(11/2^-)$	authors′ level scheme implies M2 multipolarity.
762.5	10.0 *5*	5479.5		4717.0	$(25/2^+)$	
771.6	6.0 *4*	5488.6		4717.0	$(25/2^+)$	
829.8	9.0 *7*	4487.1	$(23/2^+)$	3657.3	$(21/2^+)$	
950.4	100	950.4	$9/2^+$	0.0	$5/2^+$	
1003.8	5.8 *7*	3605.2		2601.4		
1059.7	23.0 *8*	4717.0	$(25/2^+)$	3657.3	$(21/2^+)$	
1167.8	8.0 *5*	6647.3		5479.5		
1334.6	29 *3*	2284.9	$(11/2^-)$	950.4	$9/2^+$	
1424.7	46 *4*	2375.2	$(13/2^-)$	950.4	$9/2^+$	authors′ level scheme implies M2 multipolarity.
1824.4	4.6 *4*	2774.9		950.4	$9/2^+$	

[†] Uncertainties unstated by authors.

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Level Scheme

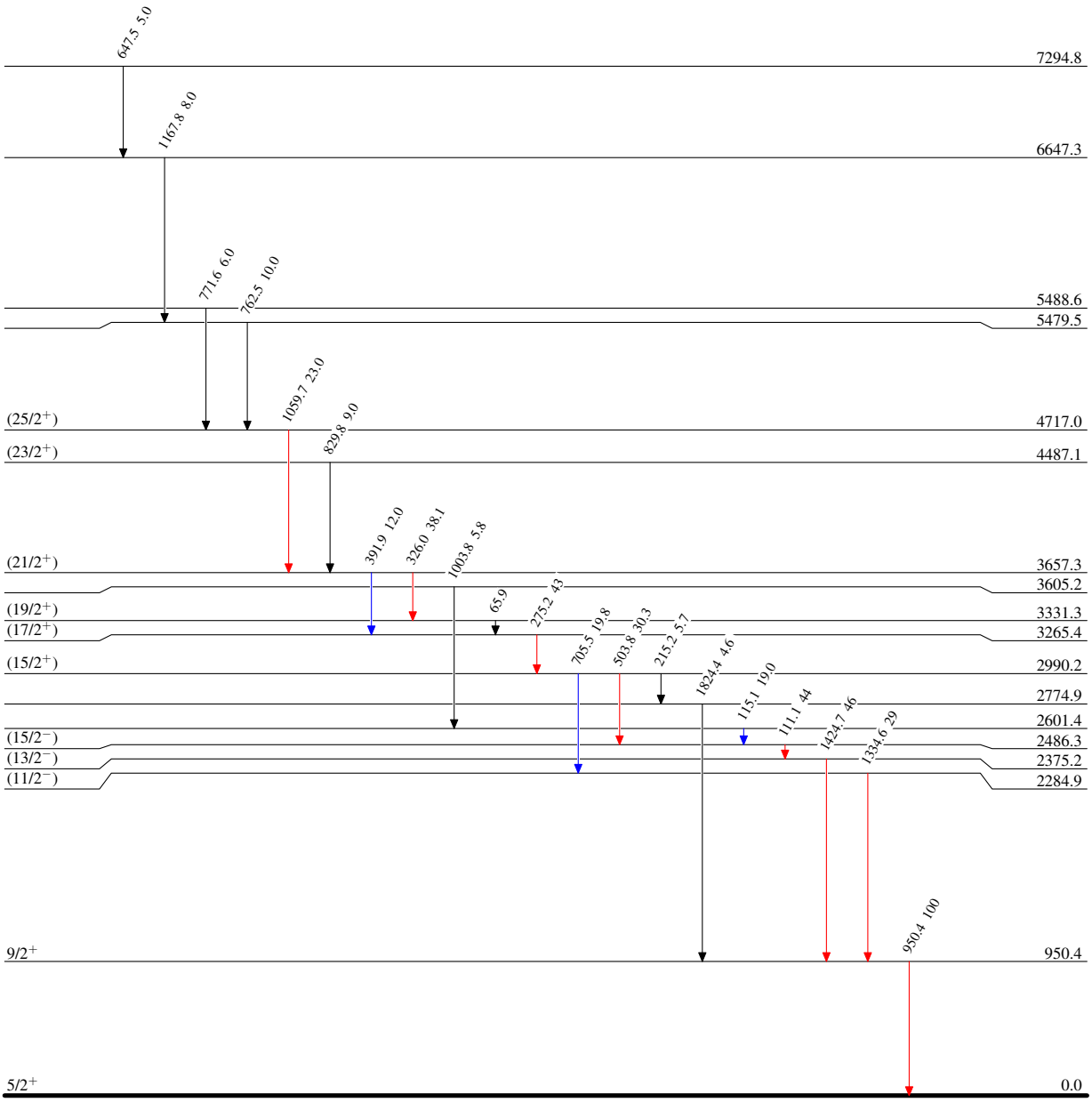
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{93}_{40}Zr_{53}$