^{176}Yb(^{23}Na,Xγ) 2005Fo05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson and W. D. Kulp(a)	NDS 129, 1 (2015)	27-Jul-2015

Includes ^{173}Yb(^{24}Mg,Xγ) and ^{208}Pb(^{18}O,Xγ).

^{87}Rb isotope produced in fission of compound nucleus in three independent experiments: 1. ^{173}Yb(^{24}Mg,Xγ) E=134.5 MeV; 2. ^{176}Yb(^{23}Na,Xγ) E=129 MeV; 3. ^{208}Pb(^{18}O,Xγ) E=91 MeV.

Measured Eγ, Iγ, $\gamma\gamma$, fragment-γ coin with the Gammasphere array. For the first experiment, the array consisted of 92 Compton-suppressed large volume HPGe detectors while in the latter two, the number of Ge detectors was increased to 100.

^{87}Rb Levels

E(level)[†][@]	J$^\pi$[&]	$T_{1/2}$	Comments
0.0	$3/2^-$		J$^\pi$: From Adopted Levels.
402.50 *19*	$5/2^-$		J$^\pi$: From Adopted Levels.
1578.01 *25*	$9/2^+$	6 ns *1*	$T_{1/2}$: From Adopted Levels. Earlier Configuration, in the literature, was proposed as: 85%[($g_{9/2}\otimes 0^+$)]+14%[($g_{9/2}\otimes 2^+$)]; 2005Fo05 suggest a small admixture of $p_{3/2}\otimes 3^-$ based upon observation of proposed E3 transition from isomer.
3001.7 *5*	$(11/2)^+$		Proposed configuration=$\pi g_{9/2}\otimes 2^+$. J$^\pi$: From Adopted Levels.
3098.0 *5*	$(11/2,13/2)^+$		J$^\pi$: Based on L=5 in (p,p′) and transition to $9/2^+$ See Adopted Levels.
3409.0 *4*	$(13/2^+)$		Proposed configuration=$\pi g_{9/2}\otimes 2^+$.
3643.8 *4*	$(15/2,17/2^+)$		Proposed configuration=$\pi g_{9/2}\otimes 4^+$. J$^\pi$: $(15/2^+)$ in Adopted Levels.
4090.5[‡] *12*			
4150.1[‡] *4*			
4314.6[‡] *15*			
4854.2[‡] *5*			J$^\pi$: $(19/2^+)$ in Adopted Levels.
5025.7[‡] *5*			
5480.0[‡] *7*			
5789.5[‡] *11*			
6345.1[‡] *12*			
6564.7[#] *8*			
6820.3[#] *8*			
7241.1[#] *10*			

[†] Possible origin of states above 3644 level suggested in discussion of 2005Fo05.

[‡] Proposed configuration=$\pi g_{9/2}\otimes[5^-,6^-,7^-$ and/or $\nu g_{9/2}^{-1}d_{5/2}]$.

[#] Possible configuration=$[\pi f_{5/2}^{-1}g_{9/2}^2]\otimes[\nu g_{9/2}^{-1}d_{5/2}]$.

[@] From least-squares fit to Eγ′s (by evaluators).

[&] Assignments proposed to levels above $9/2^+$ isomer based upon comparison with experimental and theoretical results on states energetically comparable in ^{85}Kr and ^{89}Y as well with shell model calculations and suggested coupling configurations.

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$\gamma(^{87}Rb)$

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[@]	Comments
171.5 *2*	22 *6*	5025.7		4854.2				
224.1 *10*	<2	4314.6		4090.5				
234.8 *2*	55 *8*	3643.8	(15/2,17/2$^+$)	3409.0	(13/2$^+$)			
255.4 *6*	5 *2*	6820.3		6564.7				
402.5 *2*	100[#]	402.50	5/2$^-$	0.0	3/2$^-$			
407.3 *6*	5 *1*	3409.0	(13/2$^+$)	3001.7	(11/2)$^+$			
420.8 *6*	5 *2*	7241.1		6820.3				Mult.: transition may be part of sequence of strong M1 transitions, similar to that which is observed above 7 MeV in ^{89}Y.
454.2 *5*	20 *3*	5480.0		5025.7				
506.2 *2*	48 *5*	4150.1		3643.8	(15/2,17/2$^+$)			
545.9 *10*	3 *1*	3643.8	(15/2,17/2$^+$)	3098.0	(11/2,13/2)$^+$			
704.0 *2*	22 *6*	4854.2		4150.1				
865.1 *10*	2.5 *5*	6345.1		5480.0				
876.0 *6*	7 *2*	5025.7		4150.1				
935.3 *10*	2.5 *8*	5789.5		4854.2				
1052.1 *10*	4 *1*	4150.1		3098.0	(11/2,13/2)$^+$			
1084.4 *6*	6 *2*	6564.7		5480.0				
1088.8 *10*	2.2 *7*	4090.5		3001.7	(11/2)$^+$			
1175.5 *2*	77[#] *9*	1578.01	9/2$^+$	402.50	5/2$^-$	M2	8.03×10^{-4} *12*	α(K)=0.000711 *10*; α(L)=7.70×10^{-5} *11*; α(M)=1.272×10^{-5} *18* α(N)=1.446×10^{-6} *21*; α(O)=6.31×10^{-8} *9*; α(IPF)=6.70×10^{-7} *10*
1210.6 *6*	5 *2*	4854.2		3643.8	(15/2,17/2$^+$)			
1340.5 *6*	5 *2*	6820.3		5480.0				
1423.7 *6*	8 *2*	3001.7	(11/2)$^+$	1578.01	9/2$^+$			
1520.0 *5*	11 *3*	3098.0	(11/2,13/2)$^+$	1578.01	9/2$^+$			
1539.2 *10*	3 *1*	6564.7		5025.7				
1578.0 *5*	11[#] *3*	1578.01	9/2$^+$	0.0	3/2$^-$	[E3]	4.08×10^{-4} *6*	α(K)=0.000319 *5*; α(L)=3.45×10^{-5} *5*; α(M)=5.69×10^{-6} *8* α(N)=6.45×10^{-7} *9*; α(O)=2.78×10^{-8} *4*; α(IPF)=4.89×10^{-5} *7* E_γ: this transition was suggested as depopulating a (1/2,3/2)$^-$ state 1578.05 level in the literature. 2005Fo05 note that the two levels at 1578.05 and 1577.9 cannot be resolved based either on energy or the branching ratios (which are almost the same for both levels), however, the assignment of this γ ray to (1/2,3/2)$^-$ level seems unlikely as the population of such a non-yrast state in the fission of the compound nuclei is not

Continued on next page (footnotes at end of table)

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γ(^{87}Rb) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						expected. Mult.: E3 multipolarity proposed for this γ ray as it is seen in coincidence with all the transitions above the isomer.
1831.0 *2*	57 *9*	3409.0	(13/2$^+$)	1578.01	9/2$^+$	

[†] 2005Fo05 quote uncertainties on γ-ray energies as varying from 0.2-0.5 keV for strong transitions and from 0.6-1.0 keV for the weaker ones. Therefore the following uncertainties are assigned: 0.2 keV for Iγ>20, 0.5 keV for Iγ=10-20, 0.6 keV for Iγ=5-10 and 1.0 for Iγ<5.

[‡] Obtained from ^{176}Yb(^{23}Na,Xγ) reaction in second experiment.

[#] Obtained from double gate on known transitions of ^{106}Ru complementary fragment from fission of ^{199}Tl in second experiment.

[@] Additional information 1.

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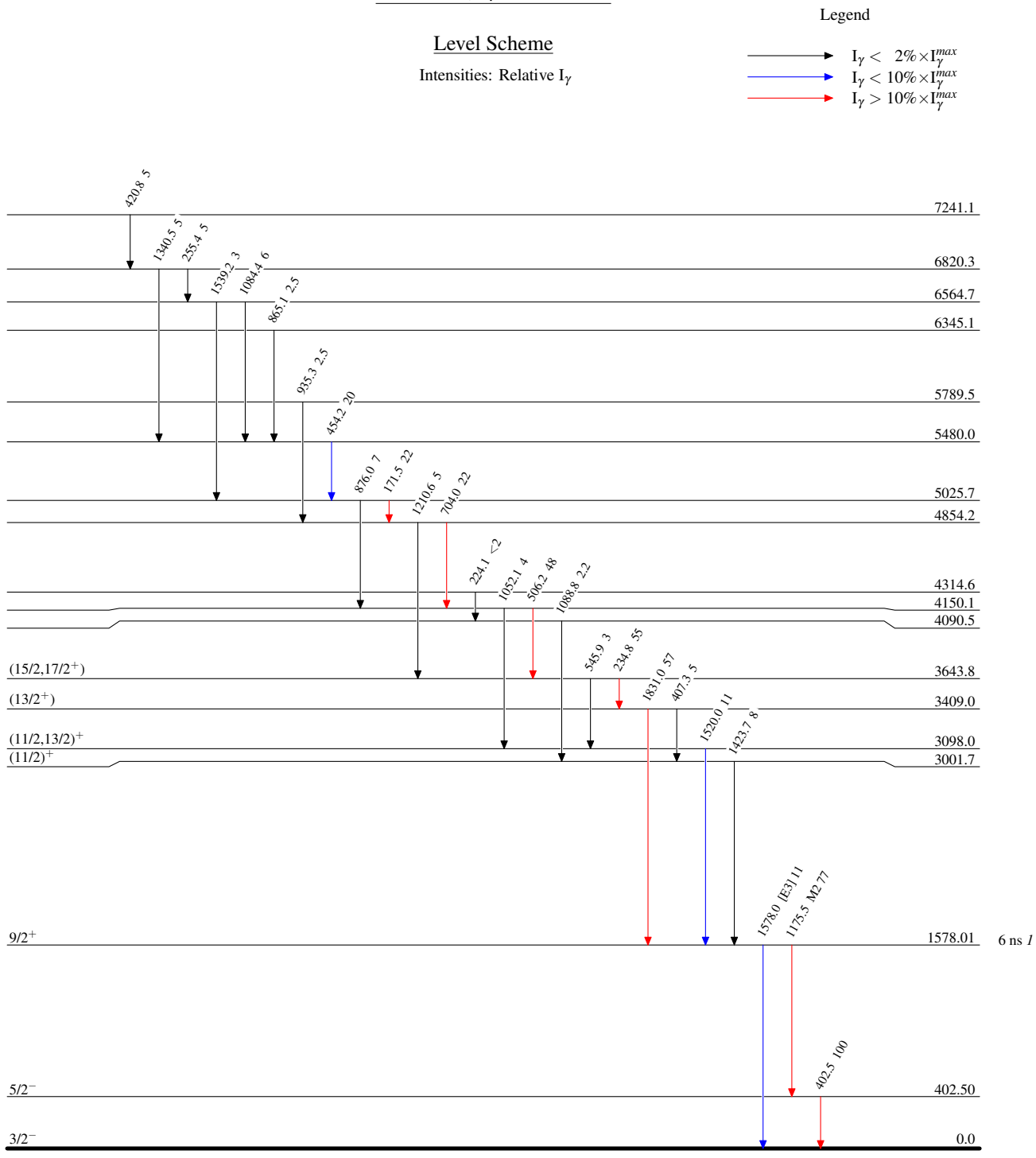
Level Scheme

Intensities: Relative I_γ



$^{87}_{37}Rb_{50}$