^{235}U(n,Fγ) 2016Cz01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, E. A. Mccutchan	NDS 165, 1 (2020)	1-Mar-2020

2016Cz01: E(n)=cold neutrons from PF1B facility of the Institut Laue-Langevin (ILL), Grenoble. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$, $\gamma\gamma$(t), and $\gamma\gamma\gamma$-coincidences between transitions in ^{90}Rb and those in complementary fission fragments ^{143}Cs and ^{144}Cs within a 200 ns time window using EXOGAM array.

^{90}Rb Levels

E(level)[†]	J$^\pi$[#]	T$_{1/2}$[@]	Comments
0.0	0$^-$		Configuration=$\pi p^{-1}_{3/2}\otimes\nu(d^3_{5/2})_{3/2}$ (2016Cz01).
106.92 *15*	3$^-$		E(level): from the Adopted Levels, held fixed in least-squares adjustment. Configuration=$\pi p^{-1}_{3/2}\otimes\nu(d^3_{5/2})$ or $\pi f^{-1}_{5/2}\otimes\nu(d^3_{5/2})$.
162.72 *18*	4$^-$	<7 ns	Configuration=$\pi p^{-1}_{3/2}\otimes\nu(d^3_{5/2})$ or less likely $\pi f^{-1}_{5/2}\otimes\nu(d^3_{5/2})$.
1127.90[‡] *20*	(5$^+$)	<7 ns	J$^\pi$: $\gamma\gamma(\theta)$ for 965-56 cascade gives 5 or 6; 365.1 (M1+E2) γ from 1493, 6$^{(+)}$ favors (5$^+$).
1204.75 *20*	5	<7 ns	J$^\pi$: J=4 and 6 are not consistent with $\gamma\gamma(\theta)$ result for the 1042-55.8 cascade, with δ(55.8)=0.302 (2016Cz01). Proposed configuration=$\pi f^{-1}_{5/2}\otimes\nu(d^3_{5/2})$ would give $J^\pi=5^-$.
1492.98[‡] *21*	6$^{(+)}$	<7 ns	J$^\pi$: $\gamma\gamma(\theta)$ data for 365-965 cascade are consistent with 6 ->5 ->4 or 6 -> 6 ->4 sequences and large δ(Q/D) value for the 365γ in both spin sequences. This implies mult=M1+E2, and thus the same parity for 1493 and 1128 levels. The $\gamma\gamma(\theta)$ data for the 288-1042 cascade is consistent with J=5 or 6 for 1493 level. Absence of transition to 163, 4$^-$ level suggests positive parity for J=6 for the 1493 level.
1703.67[‡] *23*	(7)	<7 ns	J$^\pi$: $\gamma\gamma(\theta)$ consistent with J=6 or 7, but absence of transitions to 1128, (5$^+$) and 1204, 5 makes J=6 less likely.
2500.4 *4*	(7,8$^+$)		J$^\pi$: (8$^+$) is more likely if this is an yrast level.
2686.96 *25*	(8,9$^+$)		
3401.3 *3*			
3518.2 *4*			
3633.8 *6*			

[†] From least-squares fit to Eγ, by evaluators, except where noted.
[‡] Proposed member of $\pi g_{9/2}\otimes\nu d^3_{5/2}$ multiplet.
[#] As proposed by 2016Cz01, based on angular correlation measurements, yrast pattern of population of levels, decay characteristics, and comparison with shell-model predictions.
[@] From $\gamma\gamma$(t) (2016Cz01).

$\gamma(^{90}$Rb)

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[†]	δ[†]	α[‡]	Comments
55.8 *1*	90 *9*	162.72	4$^-$	106.92	3$^-$	M1+E2	0.298 *25*	1.35 *10*	α(exp)=1.35 *10* (2016Cz01) α(exp): deduced by 2016Cz01 from intensity balance. Mult.,δ: from α(exp).
106.92 *15*		106.92	3$^-$	0.0	0$^-$				E$_\gamma$: from the Adopted Gammas.
117.2 *2*	7 *2*	3518.2		3401.3					
186.5 *3*	5 *2*	2686.96	(8,9$^+$)	2500.4	(7,8$^+$)				
210.7 *1*	44 *8*	1703.67	(7)	1492.98	6$^{(+)}$				(211γ)(288γ)(θ): A$_2$=+0.029 *31*, A$_4$=+0.064 *68*.

Continued on next page (footnotes at end of table)

^{235}U(n,Fγ) 2016Cz01 (continued)

$\gamma(^{90}Rb)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	Comments
								δ(Q/D)=+0.01 *+12−11* or +16 *+∞−11* for J(1703.67 level)=7. δ(Q/D)=+1.0 *+11−4* or −4.4 *+23−∞* for J(1703.67 level)=6. (211γ)(365γ)(θ): A_2=−0.036 *30*, A_4=−0.018 *64*. δ(Q/D)=+0.07 *5* or +8.8 *+54−25* for J(1703.67 level)=7 and J(1127.9 level)=5. δ(Q/D)=+0.06 *42* or +8.8 *+48−24* for J(1703.67 level)=7 and J(1127.9 level)=6. δ(Q/D)=+0.81 *+15−12* or −2.9 *+6−11* for J(1703.67 level)=6 and J(1127.9 level)=5.
288.2 *1*	58 *9*	1492.98	$6^{(+)}$	1204.75	5	D,D+Q		(288γ)(1042γ)(θ): A_2=+0.038 *26*, A_4=+0.007 *56*. δ(Q/D)=+0.05 *4* or +8.5 *+48−22* for J(1492.98 level)=6. δ(Q/D)=+0.76 *+13−11* or −3.5 *+8−14* for J(1492.98 level)=5.
365.1 *1*	39 *9*	1492.98	$6^{(+)}$	1127.90	(5^+)	(M1+E2)		Mult.: all $\gamma\gamma(\theta)$ solutions lead to significant quadrupole admixture suggestive of mult=(M1+E2) rather than (E1+M2). (365γ)(965γ)(θ): A_2=−0.059 *48*, A_4=+0.01 *10*. δ(Q/D)=+0.47 *+42−31* or +1.8 *+26−17* for J(1127.9 level)=5. δ(Q/D)=+0.45 *+18−16* or −1.46 *+56−39* for J(1127.9 level)=6.
714.6 *2*	7 *2*	3401.3		2686.96	$(8,9^+)$			
830.7 *3*	4 *2*	3518.2		2686.96	$(8,9^+)$			
[x]880.3 *1*	4 *2*							
965.2 *1*	44 *8*	1127.90	(5^+)	162.72	4^-			(965γ)(56γ)(θ): A_2=+0.044 *89*, A_4=+0.11 *21*. δ(Q/D)=+0.24 *+21−28* or +3 *+16−3* for J(1127.9 level)=5. δ(O/Q)=0 for J(1127.9 level)=6.
983.3 *1*	15 *3*	2686.96	$(8,9^+)$	1703.67	(7)			
1007.1 *5*	10 *3*	2500.4	$(7,8^+)$	1492.98	$6^{(+)}$			
1042.0 *1*	100 *4*	1204.75	5	162.72	4^-	D(+Q)	−0.08 *+26−29*	(1042γ)(56γ)(θ): A_2=−0.046 *86*, A_4=+0.07 *18*.
1133.4 *4*	8 *3*	3633.8		2500.4	$(7,8^+)$			

[†] From $\gamma\gamma(\theta)$ in 2016Cz01, except where noted.

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[x] γ ray not placed in level scheme.

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Level Scheme

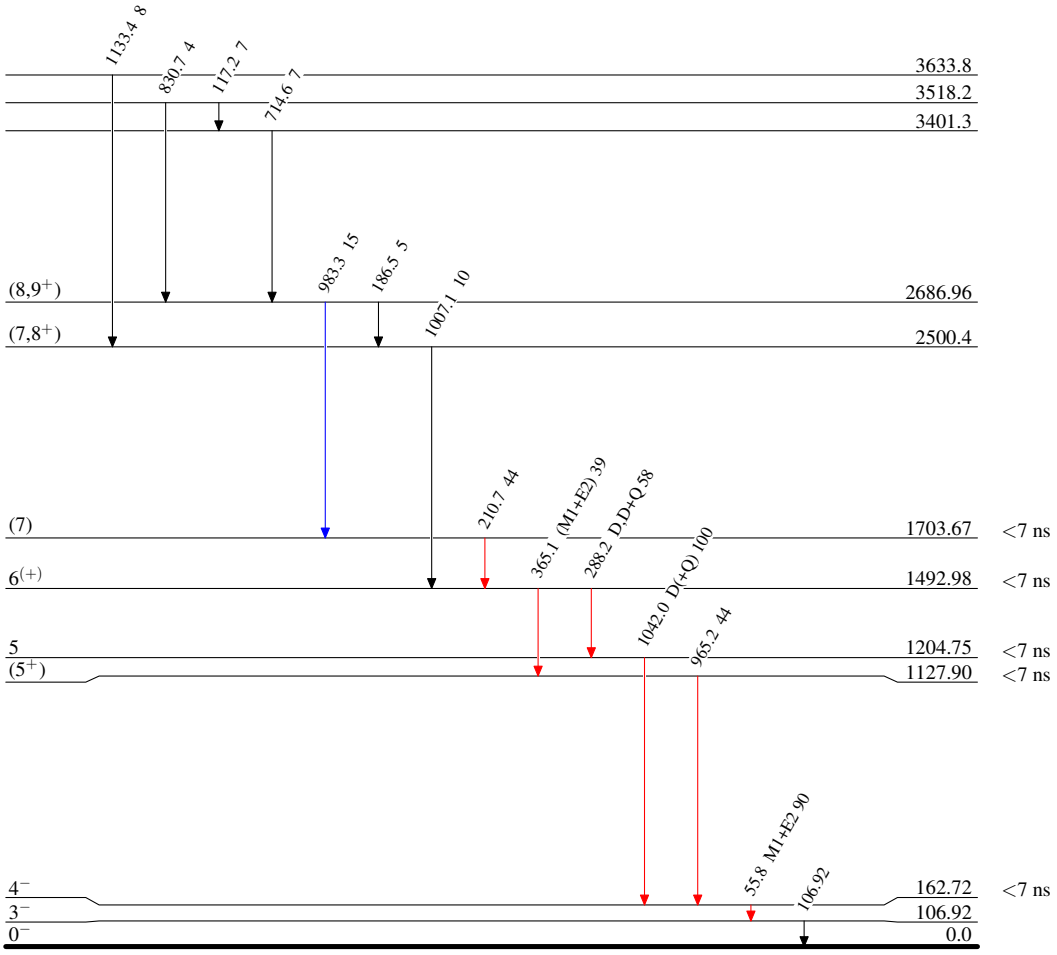
Intensities: Relative I_γ

Legend

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

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

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



$^{90}_{37}Rb_{53}$