^{235}U(n,Fγ) 2012Mu08,2014Re15,2017Rz01

History

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

2012Mu08: E=thermal neutrons from the Canada India Research Utility Services (CIRUS) reactor facility, Bhabha Atomic Research Center (BARC), Mumbai. Measured Eγ, Iγ, $\gamma\gamma$-coin using two Clover HPGe detectors equipped with anti-Compton shields, in coincidence mode.

2014Re15: E=cold neutron beam from Institut Laue-Langevin (ILL) reactor at Grenoble, France. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$(t) using the EXILL spectrometer consisting of eight BGO shielded EXOGAM Clover detectors and the FATIMA array consisting of sixteen 5% Ce-doped $LaBr_3$ detectors (FWHM=500-270 ps for the FATIMA prompt response function). Deduced $T_{1/2}$ of 707-keV level using the generalized centroid difference (GCD) method.

2017Rz01: E(n)=cold neutrons from PF1B facility of ILL-Grenoble. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$ using EXILL array of 28 pairs of the eight clover detectors mounted in a planar, octagonal geometry. Identification of γ rays from ^{90}Kr in correlation with the γ rays from its complementary fission partners ^{144}Ba, ^{143}Ba and ^{142}Ba.

Several γ rays previously assigned to ^{90}Kr have been identified as belonging to ^{91}Kr by 2017Rz01. Some include a 468γ from a proposed 1974.3 level, a 771γ from a 2745 level and a 799γ from a 1506 level. For a full list of transitions and their original placements, see the ^{248}Cm and ^{252}Cf decay datasets. These transitions and their corresponding levels are not included in the Adopted Levels and Gammas, nor are they placed in this dataset.

^{90}Kr Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0	0^+		
707.3	2^+	10.4 ps *69*	$T_{1/2}$: from centroid difference between 707γ and 1123γ in $LaBr_3$ coincidence spectra (2014Re15). Spectra obtained by summing gates on the 199 keV and 331 keV transitions (from the complementary partner ^{144}Ba) in the EXILL array (2014Re15). $\Delta T_{1/2}$ includes uncertainty from large Compton background and prompt response difference uncertaint of 10 ps (2014Re15).
1362.7	2^+		
1764.4	$3^+,4^+$		J$^\pi$: $\gamma\gamma(\theta)$ data are consistent with J=2,3,4; 2^+ is rejected by 2017Rz01 due to the absence of transition to the g.s.
1830.7	4^+		
2596.8			
2853.5	5		
3085.5	5^+		
3224.1	$5^+,6^+$		J$^\pi$: $\gamma\gamma(\theta)$ data are consistent with J=4,5,6; 4^+ is rejected by 2017Rz01 due to the absence of transition to any of the 2^+ states.
3695.2			
3897.2			
4038.2			
4099.3			
4285.1			
5053.9			

[†] From least-squares fit to Eγ values by the evaluators.

[‡] As proposed by 2017Rz01, based on $\gamma\gamma(\theta)$ measurements.

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γ(^{90}Kr)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.	δ	Comments
707.3	2$^+$	707.3		0	0$^+$	Q[‡]		I_γ: other: >226 (2012Mu08).
1362.7	2$^+$	655.5	63.5 *15*	707.3	2$^+$	(M1+E2)	+0.507	δ: from (655.5γ)(707.3γ)(θ): A_2=−0.129 *14*, A_4=+0.090 *27*. I_γ: other: 53 *3* (2012Mu08).
		1362.7	100	0	0$^+$	Q[‡]		I_γ: other: 63 *3* (2012Mu08).
1764.4	3$^+$,4$^+$	401.7	415 *16*	1362.7	2$^+$			Mult=Q for J(1764)=4. δ(Q/D)=+0.242 *+17−16* for J(1764)=3, +0.194 *+15−13* for J(1764)=2 from (401.7γ)(1362.7γ)(θ): A_2=+0.100 *1*, A_4=−0.004 *20* (2017Rz01). I_γ: other: 47 *7* (2012Mu08).
		1057.1	100	707.3	2$^+$			Mult=Q for J(1764)=4. δ(Q/D)=+0.182 *+53−48* or +2.75 *+38−48* for J(1764)=3, +0.244 *45* for J(1764)=2 (2017Rz01). Mult.: from (1057.1γ)(707.3γ)(θ): A_2=+0.062 *33*, A_4=−0.16 *74* (2017Rz01).
1830.7	4$^+$	1123.4		707.3	2$^+$	Q[‡]		Mult.: (1123.4γ)(707.3γ)(θ): A_2=+0.095 *15*, A_4=−0.012 *33* (2017Rz01). I_γ: other: 100 *5* (2012Mu08).
2596.8		832.4		1764.4	3$^+$,4$^+$			
2853.5	5	1022.8		1830.7	4$^+$	D+Q[‡]	+0.072 *19*	Mult.,δ: (1022.8γ)(1123.4γ)(θ): A_2=−0.023 *12*, A_4=+0.004 *22* (2017Rz01). I_γ: other: 53 *3* (2012Mu08).
3085.5	5$^+$	1254.7		1830.7	4$^+$			δ(Q/D)=+0.47 *+15−11* or +1.72 *+47−48* for J(3085)=5; +0.05 *+12−15* for J(3085)=4 from (1254.7γ)(1123.4γ)(θ): A_2=+0.180 *43*, A_4=−0.001 *94* (2017Rz01).
		1321.1		1764.4	3$^+$,4$^+$			
3224.1	5$^+$,6$^+$	1393.4		1830.7	4$^+$			Mult.: Q for J(3224)=6. δ(Q/D)=+0.33 *+15−11* or +2.38 *+95−66* for J(3224)=5; −1.39 *+40−52* or +0.21 *+15−16* for J(3224)=4. Mult.: (1393.4γ)(1123.4γ)(θ): A_2=+0.122 *58*, A_4=−0.012 *123* (2017Rz01).
		1459.7		1764.4	3$^+$,4$^+$			
3695.2		1098.4		2596.8				
3897.2		1043.7		2853.5	5			I_γ: other: 47 *7* (2012Mu08).
4038.2		814.1		3224.1	5$^+$,6$^+$			
4099.3		1245.8		2853.5	5			
4285.1		1199.6		3085.5	5$^+$			
5053.9		1156.7		3897.2				

[†] Relative photon intensity (2017Rz01). 2012Mu08 provide intensities relative to Iγ(1123γ)=100. These are given in the comments.
[‡] From γγ(θ) results in 2017Rz01, mult=Q indicates stretched quadrupole.

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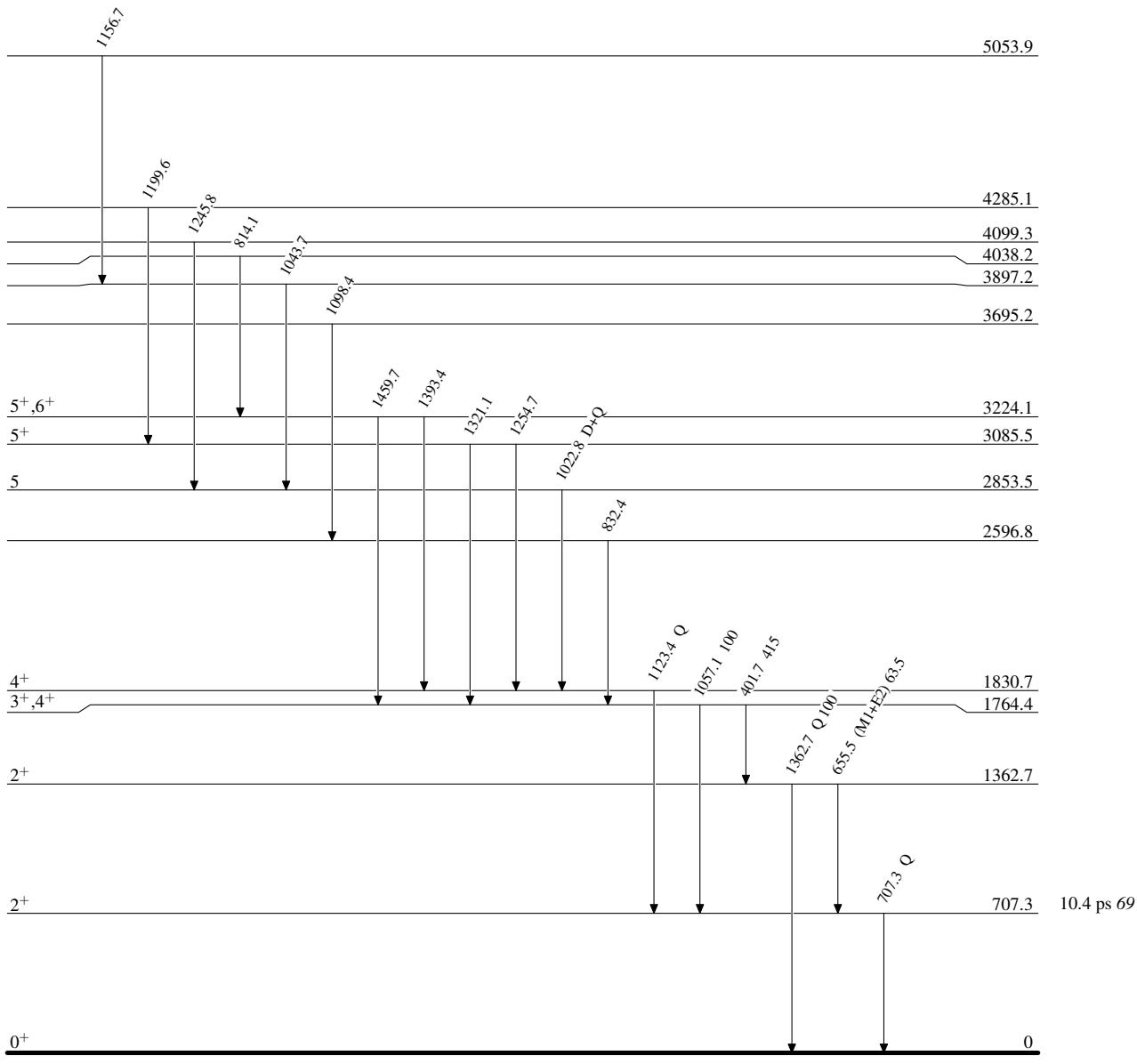
Level Scheme

Intensities: % photon branching from each level



$^{90}_{36}Kr_{54}$