

⁹²Mo(⁵⁴Fe,5p2n γ) 2011Cu01

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain		NDS 138, 1 (2016)	15-Oct-2016

2011Cu01: Measured E γ , I γ , (recoil) γ coin, isomer half-life using JUROGAM array of 40 HPGe detectors for prompt γ rays and GREAT planar and clover Ge detectors for delayed γ rays. Recoil-decay tagging method. Recoil products were transported to the focal plane of the gas-filled recoil-ion transport unit (RITU) and implanted into a 500- μ m thick Al foil. Multiwire Proportional Counter (MWPC) used to detect recoils.

¹³⁹Eu Levels

E(level) [†]	J π [‡]	T _{1/2}	Comments
0.0	(11/2 ⁻)		
117.20 10	(13/2 ⁻)		
121.80 10	(9/2 ⁻)		
148.20 [#] 23	(7/2 ⁺)	10 μ s 2	T _{1/2} : from time difference of the recoils and delayed γ rays (2011Cu01).
346.4 [#] 3	(11/2 ⁺)		
835.3 [#] 4	(15/2 ⁺)		
1417.6 [#] 8	(19/2 ⁺)		
2011.5 [#] 9	(23/2 ⁺)		
2482.2 [#] 10	(27/2 ⁺)		
3137.4 [#] 11	(31/2 ⁺)		

[†] From E γ data.

[‡] As proposed by 2011Cu01 based on multipolarities determined from experimental conversion coefficient and band structure.

[#] Band(A): Band based on (7/2⁺). The ordering of the transitions is based on intensities, since no $\gamma\gamma$ coin data are available due to limited statistics. Gain in alignment at $\hbar\omega \approx 0.27$ MeV, most likely configuration is $\pi g_{7/2}$ orbital.

$\gamma(^{139}\text{Eu})$

Intensity of x rays in the delayed spectrum

E(x ray)	Intensity	Designation
40.9 2	87 11	K α x-ray
47.2 2	20 4	K β x-ray

E γ	I γ	E _i (level)	J π _i	E _f	J π _f	Mult. #	α [@]	Comments
(4.6)		121.80	(9/2 ⁻)	117.20	(13/2 ⁻)			E γ : possible transition which could explain observation of 117 γ in the delayed spectrum.
26.4 2	34 [†] 6	148.20	(7/2 ⁺)	121.80	(9/2 ⁻)	(E1)	1.91 5	$\alpha(\text{exp})=5.5$ 14 B(E1)(W.u.)=4.1 \times 10 ⁻⁶ 8 Hindered E1 transition is probably due to difference in nuclear shape between the isomeric $\pi g_{7/2}$ state and $\pi h_{11/2}$ ground state.
117.2 1	21 [†] 3	117.20	(13/2 ⁻)	0.0	(11/2 ⁻)	M1	1.173	Mult.: from literature (1995Va22), but note that it is M1/E2 in 1995Va22. Observation of this γ in the delayed spectrum suggests a connecting transition between the 148-keV isomer and 117-keV level. There is no evidence of a 30-keV transition in recoil-decay

Continued on next page (footnotes at end of table)

$^{92}\text{Mo}(^{54}\text{Fe},5\text{p}2\text{n}\gamma)$ 2011Cu01 (continued) $\gamma(^{139}\text{Eu})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. #	$\alpha^@$	Comments
121.8 1	100 [†] 11	121.80	(9/2 ⁻)	0.0	(11/2 ⁻)	(E2)	1.192	tagged γ spectrum. There could be a link through a 5-keV transition from the 122-keV level to 117-keV level. $\alpha(\text{K})_{\text{exp}}=0.66$ 14 Mult.: $\alpha(\text{K})_{\text{exp}}$ gives E2(+M1) with $\delta(\text{E}2/\text{M}1)>0.85$, 2011Cu01 assign E2 without any further arguments. Evaluators treat this assignment as tentative.
198.2 2	86 [‡] 13	346.4	(11/2 ⁺)	148.20	(7/2 ⁺)			
470.7 4	39 [‡] 9	2482.2	(27/2 ⁺)	2011.5	(23/2 ⁺)			
488.9 2	100 [‡] 10	835.3	(15/2 ⁺)	346.4	(11/2 ⁺)			
582.3 7	86 [‡] 15	1417.6	(19/2 ⁺)	835.3	(15/2 ⁺)			
593.9 3	66 [‡] 13	2011.5	(23/2 ⁺)	1417.6	(19/2 ⁺)			
655.2 4	17 [‡] 6	3137.4	(31/2 ⁺)	2482.2	(27/2 ⁺)			

[†] Delayed intensity normalized to 100 for 121.8 γ .

[‡] Prompt intensity normalized to 100 for 488.9 γ .

Assigned from ce data with the consideration of 117.2-keV transition treated as pure M1, as known from 1995Va22.

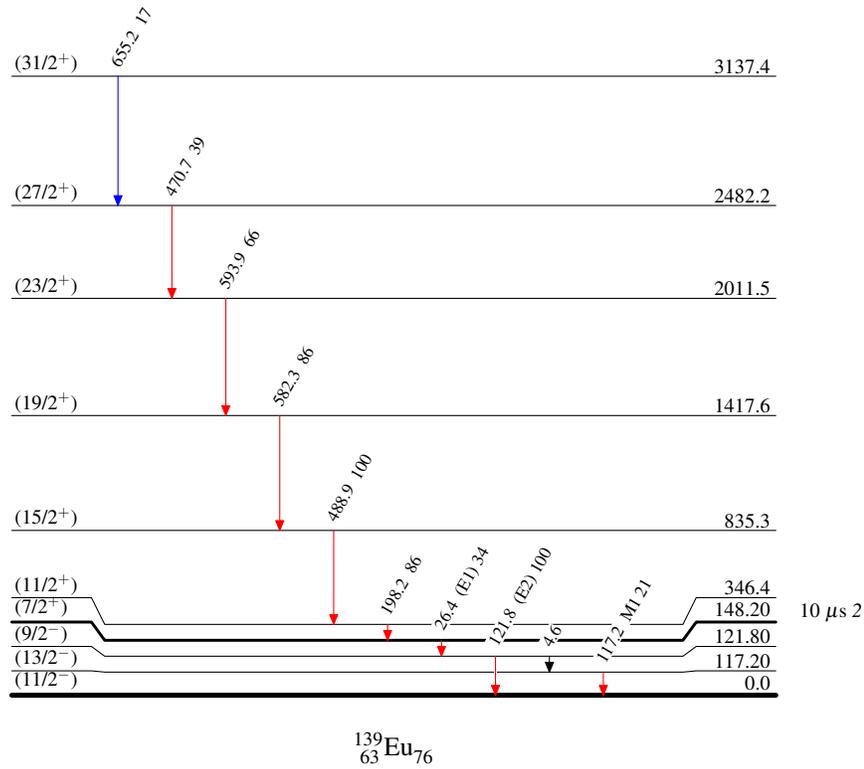
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{92}\text{Mo}(^{54}\text{Fe},5p2n\gamma)$ 2011Cu01

Legend

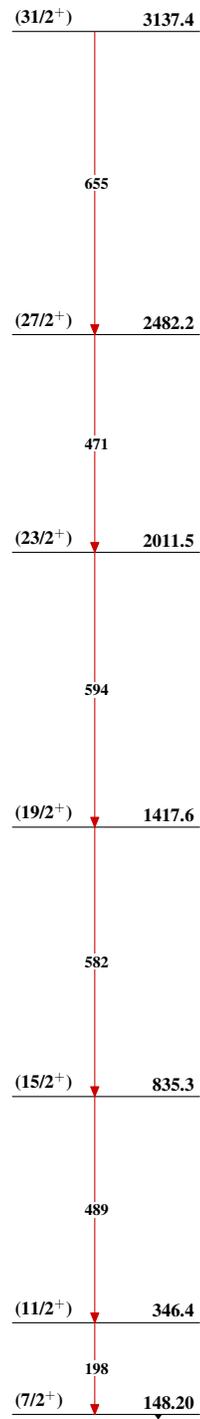
Level Scheme
 Intensities: Relative I_γ

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- - - - - γ Decay (Uncertain)



$^{92}\text{Mo}(\text{}^{54}\text{Fe}, \text{}^5\text{p}2\text{n}\gamma)$ 2011Cu01

Band(A): Band based on
(7/2⁺)

 $^{139}_{63}\text{Eu}_{76}$