^{54}Fe(^{40}Ca,αnγ) 2004Ma86

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Nov-2021

2004Ma86 (also 2004Ma32): E(^{40}Ca)=130 MeV. Measured Eγ, Iγ, $\gamma\gamma$-coin, (particle)γ-coin, $\gamma\gamma(\theta)$(DCO) using GASP array of 40 anti-Compton HPGe detectors and an 80 BGO detector inner ball. Charged particles were detected using ISIS silicon ball located inside the GASP array and neutrons were detected with n-ring detector system. Comparison with shell-model calculations. All data are from 2004Ma86.

^{89}Ru Levels

E(level)‡	J$^\pi$†	Comments
0.0#	(9/2$^+$)	E(level): assumed as the g.s.
863.7# *2*	(13/2$^+$)	
1727.7 *6*		
1917.4# *3*	(17/2$^+$)	
1967.7 *5*		
2458.4 *4*		
2766.9 *6*		
2953.9# *4*	(21/2$^+$)	
3028.5 *5*		
3221.0 *5*		
3302.5# *4*	(25/2$^+$)	
4219.3# *7*	(29/2$^+$)	
5309.4# *8*	[33/2$^+$]	
6239.2# *9*	[37/2$^+$]	

† As proposed by 2004Ma86 based on systematics and $\gamma\gamma(\theta)$ data for selected transitions.
‡ From Eγ data.
# Band(A): Yrast sequence, based on (9/2$^+$). The band is similar to the yrast sequence in ^{90}Ru. The backbends in the experimentally observed band in ^{89}Ru occur at 21/2-25/2 and 33/2-37/2 transitions. From calculations, the first backbend is predicted to be around 25/2 due to the alignment of a pair of $g_{9/2}$ protons. The second backbend at 33/2 may be due to the crossing of 3-qp band with a 5-qp band having a pair of $g_{9/2}$ neutrons and a pair of $g_{9/2}$ protons aligned. See 2004Ma86 for detailed shell-model configurations.

γ(^{89}Ru)

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	Comments
348.6 *2*	27 *2*	3302.5	(25/2$^+$)	2953.9	(21/2$^+$)	(Q)†	DCO=0.96 *21*
490.7 *3*	8 *2*	2458.4		1967.7			
541.0 *3*	11 *2*	2458.4		1917.4	(17/2$^+$)		
762.6 *3*	13 *3*	3221.0		2458.4			
849.5 *5*	6 *2*	2766.9		1917.4	(17/2$^+$)		
863.7 *2*	100 *8*	863.7	(13/2$^+$)	0.0	(9/2$^+$)	(Q)†	DCO=0.91 *23*; A$_2$=+0.67 *13*; A$_4$=+0.17 *25*
864.0 *5*	10 *4*	1727.7		863.7	(13/2$^+$)		
916.8 *5*	15 *3*	4219.3	(29/2$^+$)	3302.5	(25/2$^+$)		
929.8 *3*	7 *2*	6239.2	[37/2$^+$]	5309.4	[33/2$^+$]		
1036.5 *2*	28 *3*	2953.9	(21/2$^+$)	1917.4	(17/2$^+$)	(Q)†	DCO=0.92 *27*
1053.7 *2*	55 *4*	1917.4	(17/2$^+$)	863.7	(13/2$^+$)	(Q)†	DCO=1.10 *26*
1090.1 *4*	13 *3*	5309.4	[33/2$^+$]	4219.3	(29/2$^+$)		

Continued on next page (footnotes at end of table)

^{54}Fe(^{40}Ca,αnγ) 2004Ma86 (continued)

$\gamma(^{89}Ru)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π
1104.1 *6*	10 *3*	1967.7		863.7	$(13/2^+)$
1111.1 *4*	10 *3*	3028.5		1917.4	$(17/2^+)$

† $\gamma(\theta)$ and/or $\gamma\gamma(\theta)$ data are consistent with $\Delta J=2,Q$ transition.

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Level Scheme

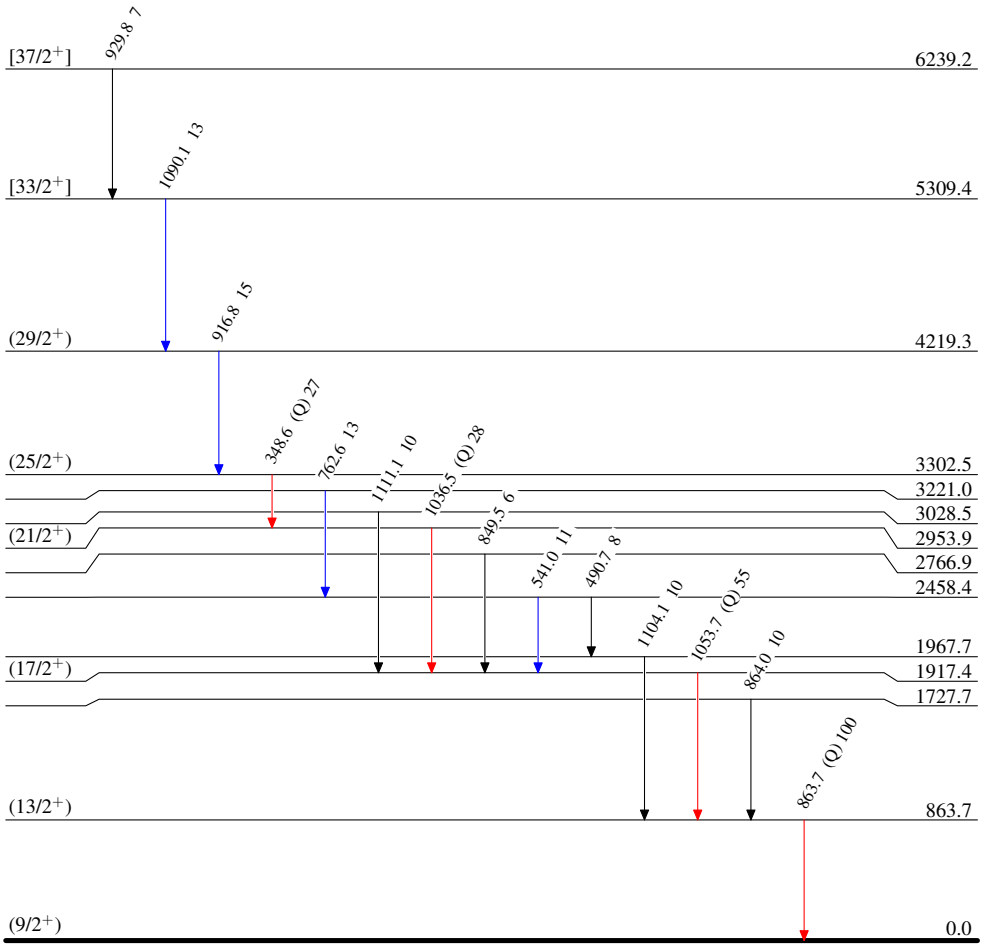
Intensities: Relative I_γ

Legend

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

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

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



$^{89}_{44}Ru_{45}$

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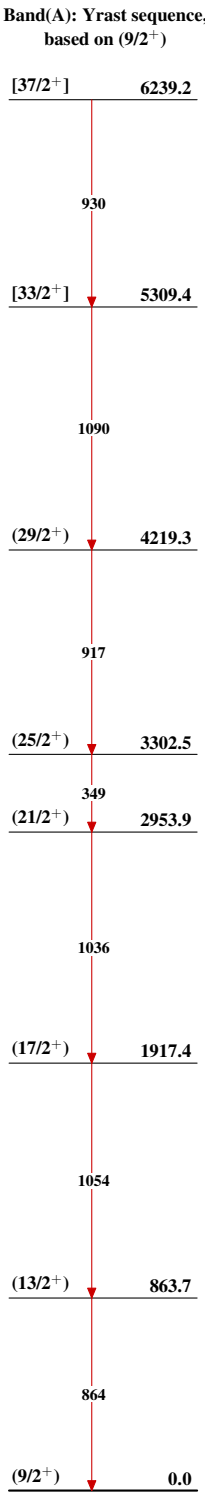

$^{89}_{44}Ru_{45}$