^{238}U(^{48}Ca,Xγ) 2009Pa20

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114, 1 (2013)	20-Oct-2012

Includes ^{238}U(^{64}Ni,Xγ) and ^{208}Pb(^{48}Ca,Xγ) reactions.
Deep inelastic reactions.
2009Pa20: ^{208}Pb(^{48}Ca,Xγ) E=305 MeV, ^{238}U(^{48}Ca,Xγ) E=330 MeV and ^{238}U(^{64}Ni,Xγ) E=430 MeV, in all experiments used 50 mg/cm^2 targets. Beams from the ATLAS accelerator at Argonne. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$ with Gammasphere array consisting of 100 Compton-suppressed HPGe detectors.
Level scheme is based on $\gamma\gamma$ coincidence data.

^{89}Rb Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	$3/2^-$		
221.0 *2*	$5/2^-$[#]		
586.0 *2*	(7/2)		
931.0 *2*			
997.5 *2*	(7/2)		
1195.4[@] *2*	$9/2^+$[#]	8 ns *2*	$T_{1/2}$: from analysis of the timing parameter in delayed coincidences between γ rays above and below the 1195.4, $9/2^+$ state.
2004.5[@] *3*	$13/2^+$[#]		
2840.5[@] *3*	$17/2^+$[#]		
4033.5[@] *4*	$(21/2^+)$[#]		
5327.7[@] *5*	$(23/2^+)$		
5605.9[@] *4*	$(25/2^+)$		
6699.6 *6*			
6704.8 *5*			
7391.3 *6*			

[†] From least-square fit to Eγ data.
[‡] As proposed in 2009Pa20 based on $\gamma\gamma(\theta)$ data for selected cascades and $g_{9/2}$ band assignment.
[#] From $\gamma\gamma(\theta)$.
[@] Band(A): $\pi g_{9/2}$,α=+1/2.

γ(^{89}Rb)

The assignment of γ rays to ^{89}Rb is based on coincidence spectra obtained with double gates set on transitions below the $9/2^+$ isomer at 1195.5 keV and confirmed by observation of delayed coincidences across the isomer.

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	Comments
198.0 *2*		1195.4	$9/2^+$	997.5	(7/2)		
221.0 *2*		221.0	$5/2^-$	0.0	$3/2^-$	D	
264.4 *3*		1195.4	$9/2^+$	931.0			
345.0 *4*		931.0		586.0	(7/2)		
411.5 *2*		997.5	(7/2)	586.0	(7/2)		
586.0 *2*		586.0	(7/2)	0.0	$3/2^-$		
686.5 *3*	<8	7391.3		6704.8			I$_\gamma$: <5 *3*.
710.0 *3*		931.0		221.0	$5/2^-$		
776.5 *3*		997.5	(7/2)	221.0	$5/2^-$		
809.1 *2*	100 *5*	2004.5	$13/2^+$	1195.4	$9/2^+$	Q	

Continued on next page (footnotes at end of table)

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γ(^{89}Rb) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
836.0 *2*	62.2 *4*	2840.5	$17/2^+$	2004.5	$13/2^+$	Q	Mult.: (836.0γ)(809.1γ)(θ): A_2=+0.15 *8*, consistent with ΔJ=2,quadrupole –> ΔJ=2,quadrupole cascade.
931.0 *4*		931.0		0.0	$3/2^-$		
974.4 *2*		1195.4	$9/2^+$	221.0	$5/2^-$	(M2)	Mult.: (974.4γ)(221.0γ)(θ): A_2=−0.16 *4* consistent with ΔJ=2,quadrupole –> ΔJ=1,dipole cascade.
997.4 *4*		997.5	(7/2)	0.0	$3/2^-$		
1098.9 *3*	13.3 *3*	6704.8		5605.9	$(25/2^+)$		
1193.0 *2*	29.9 *4*	4033.5	$(21/2^+)$	2840.5	$17/2^+$	Q	Mult.: (1193.0γ)(836.0γ)(θ): A_2=+0.17 *5*, consistent with ΔJ=2,quadrupole –> ΔJ=2,quadrupole cascade.
1294.1 *3*	12.4 *3*	5327.7	$(23/2^+)$	4033.5	$(21/2^+)$		
1371.9 *3*	<11	6699.6		5327.7	$(23/2^+)$		I_γ: <8 *3*.
1572.3 *2*	16.4 *3*	5605.9	$(25/2^+)$	4033.5	$(21/2^+)$		

† Energy uncertainty and intensities received in e-mail reply from T. Pawlat. Intensity above the isomer, normalized to $I\gamma(809.1\gamma)$=100.

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Level Scheme

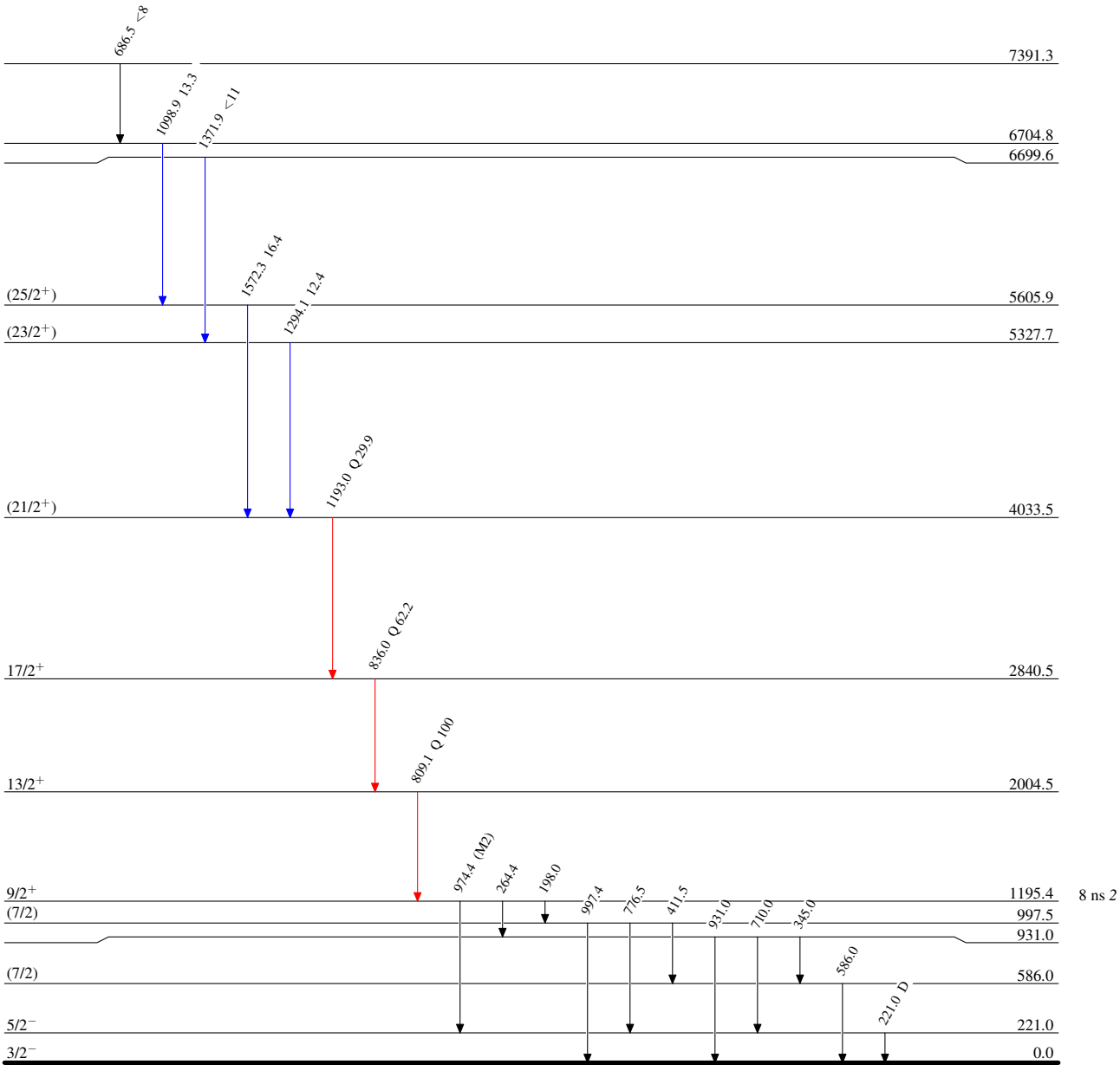
Intensities: Relative I_γ

Legend

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

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

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



$^{89}_{37}Rb_{52}$

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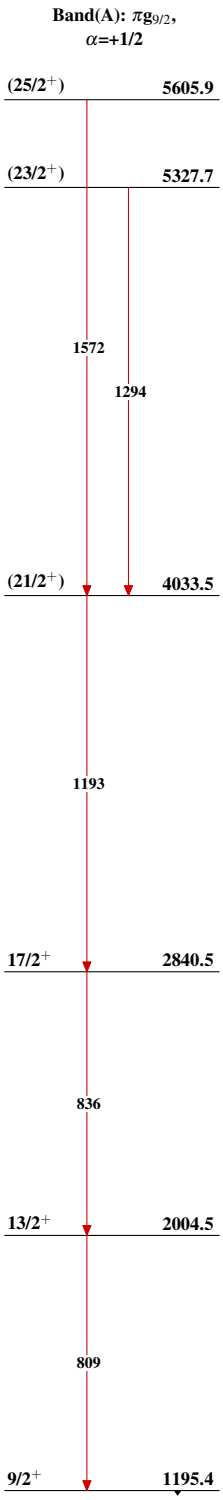

$^{89}_{37}Rb_{52}$