^{92}Mo(^{78}Kr,2pnγ) 2009Od02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 191,1 (2023)	22-Aug-2023

2009Od02: ^{78}Kr beam provided at E=335,357,365 MeV by the K130 cyclotron of the Accelerator Laboratory of the University of Jyvaskyla. The γ rays were detected by the JUROGAM Ge detector array. Reaction products and α-decays were detected by the GREAT spectrometer, two double-sided silicon strip detectors, a planar Ge detector, a clover Ge detector, and 28 Si PIN diode detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin and $\alpha\gamma$-coin, α particles correlated with implanted recoils, α-gated γ-ray spectra, half-life of $17/2^+$ state using the recoil distance Doppler-shift (RDDS) method. Deduced levels, J, π, band structures. Comparisons with theoretical calculations.

^{167}Os Levels

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0.0#	$7/2^-$		$\sigma\approx$0.6 mb (2009Od02).
87.1@ *1*	$9/2^-$		
435.1& *10*	$13/2^+$	700 ns *10*	$T_{1/2}$: from the Adopted Levels.
451.5# *1*	$11/2^-$		
502.9@ *2*	$13/2^-$		
798.0& *10*	$17/2^+$	13.9 ps *28*	$T_{1/2}$: from recoil-distance method (2009Od02).
1060.80# *15*	$15/2^-$		
1091.40@ *25*	$(17/2^-)$		
1096.40 *23*			
1341.2& *11*	$21/2^+$		
1758.20# *18*	$(19/2^-)$		
1789.9@ *3*	$(21/2^-)$		
1811.2 *4*			
1996.3& *11*	$25/2^+$		
2148.9b *11*	$(23/2^-)$		
2206.6a *11*	$(23/2^-)$		
2332.0 *11*			
2417.6 *12*			
2510.2a *11*	$(27/2^-)$		
2556.8@ *5*	$(25/2^-)$		
2628.1 *13*			
2628.7b *11*	$(27/2^-)$		
2680.4& *11*	$29/2^+$		
2820.4 *11*			
2897.6 *11*			
3044.5a *11*	$(31/2^-)$		
3126.3b *11*	$(31/2^-)$		
3318.3& *11*	$(33/2^+)$		
3716.8a *12*	$(35/2^-)$		
3984.5& *12*	$(37/2^+)$		

† From a least-squares fit to γ-ray energies. Normalized χ^2=4.1 in comparison to critical χ^2=3.8. It is possible that some of the uncertainties in Eγ values are underestimated.

‡ As proposed by 2009Od02 in ^{92}Mo(^{78}Kr,2pnγ) based on systematics, comparisons with theoretical predictions and angular asymmetry ratios for selected transitions.

Band(A): $\nu(f_{7/2},h_{9/2}),\alpha=-1/2$.

Continued on next page (footnotes at end of table)

^{92}Mo(^{78}Kr,2pnγ) 2009Od02 (continued)

^{167}Os Levels (continued)

@ Band(a): $\nu(f_{7/2},h_{9/2})$,α=+1/2.

& Band(B): $\nu i_{13/2}$ yrast band.

a Band(C): Possible 3-quasineutron band. Configuration=$\nu(f_{7/2},h_{9/2}\otimes i^2_{13/2})$ (2009Od02).

b Band(D): Band based on (23/2$^-$). Possible 3-quasineutron band.

γ(^{167}Os)

Asymmetry Ratio R(θ)=Iγ(158°)/Iγ(108°+72°) is given under comments and typical values are 0.85 for ΔJ=1, dipole and 1.18 for ΔJ=2, quadrupole (2009Od02).

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	Comments
87.1 *1*	1.7 *1*	87.1	9/2$^-$	0.0	7/2$^-$		
210.5 *4*	3.3 *1*	2628.1		2417.6			
303.6 *2*	3.9 *4*	2510.2	(27/2$^-$)	2206.6	(23/2$^-$)		
347.6 *8*		435.1	13/2$^+$	87.1	9/2$^-$		E_γ: from 2010Sc02 in ^{167}Os IT decay; not reported in 2009Od02.
362.9 *1*	100.0 *1*	798.0	17/2$^+$	435.1	13/2$^+$	E2	R(θ)=1.28 *6*.
415.8 *2*	32.9 *4*	502.9	13/2$^-$	87.1	9/2$^-$	(Q)	R(θ)=0.92 *18*.
451.5 *1*	13.8 *3*	451.5	11/2$^-$	0.0	7/2$^-$	(Q)	R(θ)=0.93 *18*.
479.6 *1*	4.0 *4*	2628.7	(27/2$^-$)	2148.9	(23/2$^-$)		
488.4 *4*	0.3 *1*	2820.4		2332.0			
497.6 *1*	1.8 *1*	3126.3	(31/2$^-$)	2628.7	(27/2$^-$)		
513.9 *2*	2.0 *5*	2510.2	(27/2$^-$)	1996.3	25/2$^+$		
534.3 *4*	2.1 *5*	3044.5	(31/2$^-$)	2510.2	(27/2$^-$)		
543.2 *1*	65.5 *6*	1341.2	21/2$^+$	798.0	17/2$^+$	Q	R(θ)=1.37 *7*.
588.5 *1*	16.7 *3*	1091.40	(17/2$^-$)	502.9	13/2$^-$		R(θ)=0.81 *16*. This value is consistent with ΔJ=1, D or D+Q, and marginally with ΔJ=2, Q.
609.3 *1*	9.8 *2*	1060.80	15/2$^-$	451.5	11/2$^-$	Q	R(θ)=1.18 *26*.
632.5 *1*	3.9 *5*	2628.7	(27/2$^-$)	1996.3	25/2$^+$		
637.9 *3*	2.4 *5*	3318.3	(33/2$^+$)	2680.4	29/2$^+$		
644.9 *2*	3.6 *10*	1096.40		451.5	11/2$^-$		
655.3 *1*	32.2 *4*	1996.3	25/2$^+$	1341.2	21/2$^+$	Q	R(θ)=1.47 *13*.
666.2 *4*	0.8 *3*	3984.5	(37/2$^+$)	3318.3	(33/2$^+$)		
672.3 *2*	1.0 *10*	3716.8	(35/2$^-$)	3044.5	(31/2$^-$)		
684.1 *1*	11.2 *2*	2680.4	29/2$^+$	1996.3	25/2$^+$	Q	R(θ)=1.54 *26*.
697.4 *1*	2.6 *22*	1758.20	(19/2$^-$)	1060.80	15/2$^-$		
698.5 *1*	7.6 *15*	1789.9	(21/2$^-$)	1091.40	(17/2$^-$)		R(θ)=0.83 *25*. This value is consistent with ΔJ=1, D or D+Q, and marginally with ΔJ=2, Q.
750.4 *3*	2.9 *6*	1811.2		1060.80	15/2$^-$		
766.9 *4*	3.3 *5*	2556.8	(25/2$^-$)	1789.9	(21/2$^-$)		
807.5 *1*	5.3 *2*	2148.9	(23/2$^-$)	1341.2	21/2$^+$	D	R(θ)=0.54 *32*.
865.4 *2*	4.8 *5*	2206.6	(23/2$^-$)	1341.2	21/2$^+$	D	R(θ)=0.24 *39*.
901.3 *4*	0.2 *11*	2897.6		1996.3	25/2$^+$		
990.8 *1*	3.9 *2*	2332.0		1341.2	21/2$^+$		
1076.4 *6*	9.8 *4*	2417.6		1341.2	21/2$^+$		

† Assigned by the evaluators from angular asymmetry ratios from 2009Od02 as given under comments, with RUL used for 362.9γ; not listed in 2009Od02.

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Level Scheme

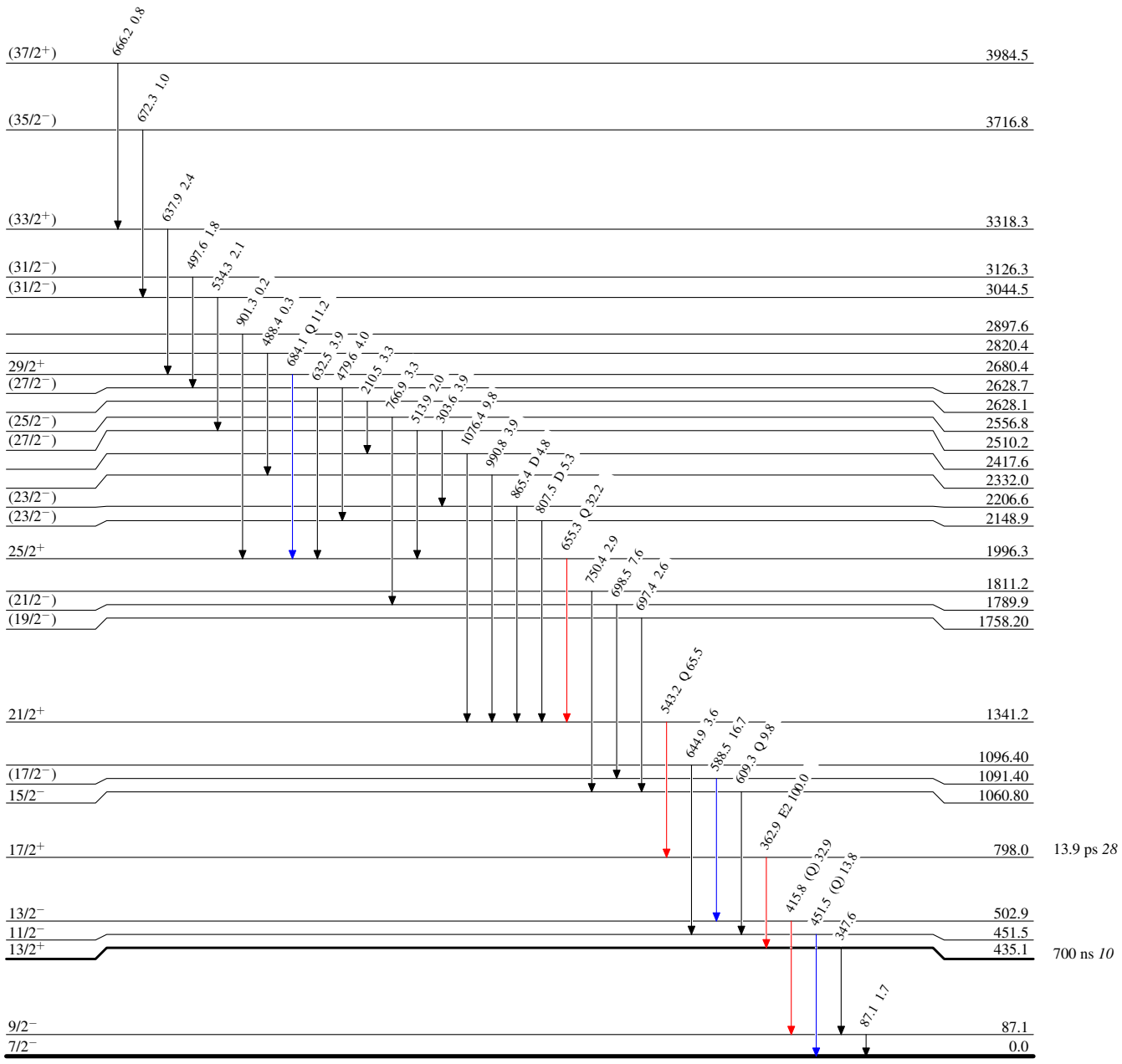
Intensities: Relative I_γ

Legend

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

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

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



$^{167}_{76}Os_{91}$

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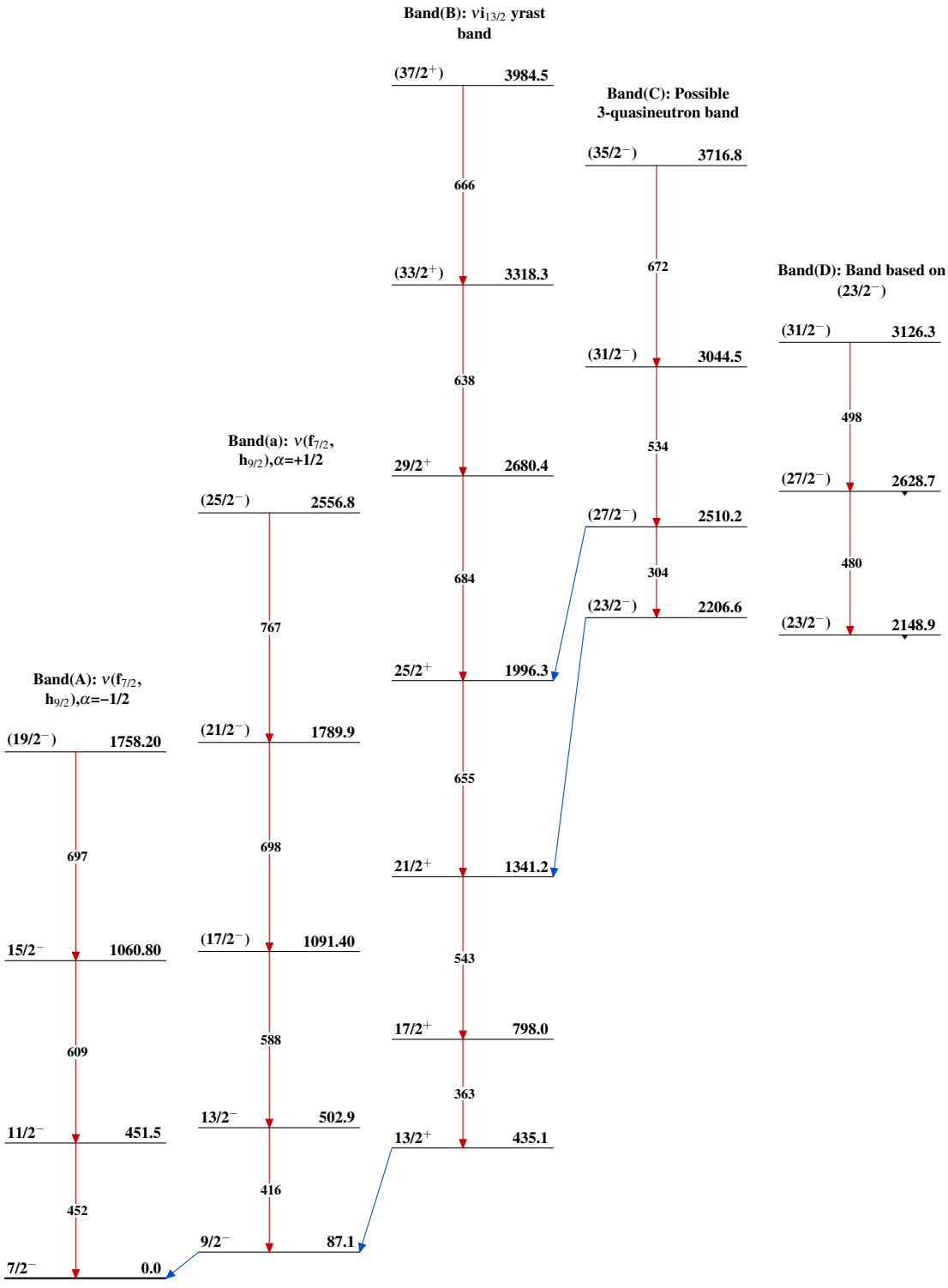

$^{167}_{76}Os_{91}$