^{92}Mo(^{83}Kr,4n2pγ),(^{82}Sr,αp2nγ) 2021Zh52,2014ThZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 209,1 (2026)	1-Oct-2025

2021Zh52: (^{83}Kr,4n2pγ): Experiment performed at Accelerator Laboratory, JYFL Finland. E(^{83}Kr)=383 MeV. Target: ^{92}Mo (0.52 mg/cm^2, stretched) with Mg (1 mg/cm^2) degrader with nine different degrader distances ranging from 11 μm to 2 mm. 15 JUROGAM II Ge detectors (ten at 133.6° and five at 157.6°), 24 Euroball clover detectors for prompt gamma rays. Gas filled electromagnetic ion separator (RITU) for separating recoiling fusion products. Double-sided planar Ge detector (absolute efficiency up to 30% at 100 keV) for low-energy γ and x-ray measurement. The lifetimes of low-lying excited states in ^{169}Os have been measured by recoil-distance Doppler-shift (RDDS) method. Selection of ^{169}Os was through recoil isomer tagging using 112 keV transition ($9/2^-$ -> $7/2^-$). B(E2) and Q_t values deduced from lifetimes.

2014ThZZ: (^{82}Sr,αp2nγ): E=392, 400 MeV; assumed ^{169}Os was produced from compound formation of ^{176}Hg via αp2n evaporation channel; Experiment performed at Accelerator Laboratory, JYFL Finland. Measured reaction products, Eγ, Iγ, $\alpha\gamma$, $\gamma\gamma$-coin using JUROGAM II, an array of Compton suppressed hyperpure germanium (HP-Ge) detectors made up of 15 EUROGAM Phase-I type detectors and 24 segmented Clover detectors. Deduced excited level energies, spin-parity, half-life.

The authors (2021Zh52) assume that the unobserved feeding does not significantly perturb the measured lifetime values in this singles RDDS analysis.

Additional information 1.

^{169}Os Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0	($7/2^-$)		
112.3 *3*	($9/2^-$)		J$^\pi$: from Adopted Levels.
192.3[@] *11*	($13/2^+$)	17.3 μs *12*	$T_{1/2}$: from 112γ(t) (2014ThZZ).
472.5[@] *15*	($17/2^+$)	51 ps *6*	Transition quadrupole moment Q_t=4.3 eb *5* (2021Zh52). $T_{1/2}$: from τ=74 ps *9*.
950.6[@] *18*	($21/2^+$)	4.9 ps *7*	Transition quadrupole moment Q_t=3.7 eb *5* (2021Zh52). $T_{1/2}$: from τ=7.0 ps *10*.
1561.9[@] *21*	($25/2^+$)		E(level): presented in Fig. 7.8 (2014ThZZ).
2265.9[@] *23*	($29/2^+$)		E(level): presented in Fig. 7.8 (2014ThZZ).

[†] From Eγ values, assuming uncertainty of 1 keV for missing ΔEγ. In 2014ThZZ (Fig. 7.8), two levels 3033 (($33/2^+$)) and 3817 (($37/2^+$)) are depopulating 768γ and 784γ, respectively. However, these two gammas are not available in the gamma-ray spectra (Figs 7.5 and 7.7) – presumably taken from the literature. Thus, these two levels and corresponding gammas are not presented in this data set.

[‡] As assigned in 2021Zh52.

[#] From 2021Zh52 using recoil gated singles spectra unless otherwise stated.

[@] Band(A): $\nu i_{13/2}$ band. Band assignment from Adopted Levels and (^{60}Ni,2pnγ) (2002Jo20).

γ(^{169}Os)

Eγ[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	α[#]	Comments
80[@]	192.3	($13/2^+$)	112.3	($9/2^-$)			Eγ: tentative assignment (2014ThZZ). 2021Zh52 state "the 80 keV transition was extremely weak and its correlation with 112 keV was barely visible above the background, presumably due to its large internal conversion coefficient". In 2014ThZZ, a weak 80-keV γ is shown in spectral Fig. 7.7a.
112.3 *3*	112.3	($9/2^-$)	0.0	($7/2^-$)			
280.2	472.5	($17/2^+$)	192.3	($13/2^+$)	[E2]	0.1125 *16*	α(K)=0.0705 *10*; α(L)=0.0319 *4*; α(M)=0.00791 *11*; α(N)=0.001906 *27*; α(O)=0.000295 *4*

Continued on next page (footnotes at end of table)

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$\gamma(^{169}Os)$ (continued)

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [#]	Comments
							α(P)=7.00×10^{-6} *10* B(E2)(W.u.)=104 *15* (2021Zh52)
478.1	950.6	(21/2$^+$)	472.5	(17/2$^+$)	[E2]	0.0255 *4*	α(K)=0.01898 *27*; α(L)=0.00497 *7*; α(M)=0.001196 *17*; α(N)=0.000290 *4*; α(O)=4.67×10^{-5} *7* α(P)=2.008×10^{-6} *28* B(E2)(W.u.)=82 *12* (2021Zh52)
611.3	1561.9	(25/2$^+$)	950.6	(21/2$^+$)			
704	2265.9	(29/2$^+$)	1561.9	(25/2$^+$)			

† From 2014ThZZ (Table 7.4 or Fig. 7.7). In 2014ThZZ (Fig. 7.8), 768γ and 784γ are depopulating 3033 ((33/2$^+$)) and 3817 ((37/2$^+$)) levels, respectively. These two depopulating gammas are not available in the gamma spectra (Figs 7.5 and 7.7) – presumably taken from the literature. These two gammas and corresponding levels are not presented in this data set.

‡ Implied from J^π values.

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

@ Placement of transition in the level scheme is uncertain.

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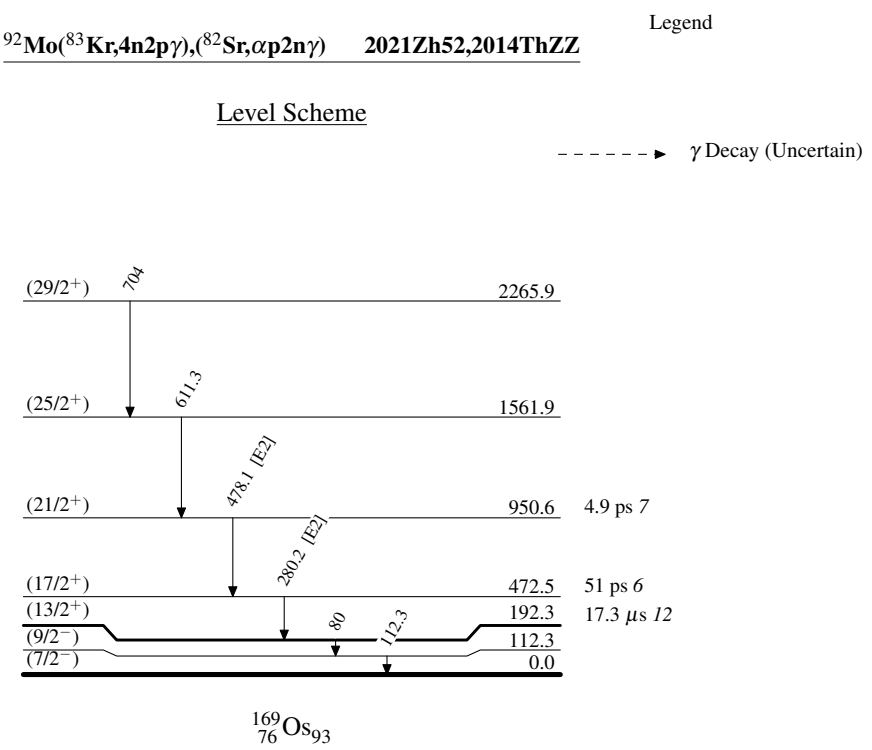
Level Scheme



$^{169}_{76}Os_{93}$

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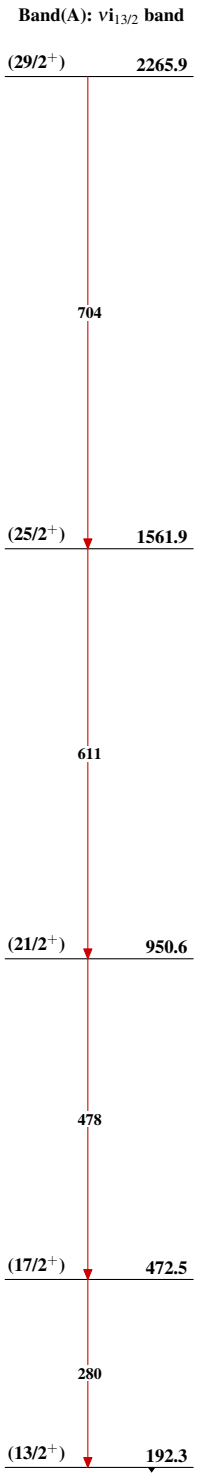

$^{169}_{76}Os_{93}$