^{9}Be(^{70}Se,^{69}Seγ) 2015Ni01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 207,1 (2026)	1-Apr-2023

No significant changes from XUNDL compiled dataset by J. Chen (NSCL, MSU), January 26, 2015, except for an unplaced gamma by 2015Ni01 that has been included by the evaluator in this dataset.

2015Ni01: E=175 MeV/nucleon ^{78}Kr primary beam was produced from the Coupled Cyclotron Facility at the National Superconducting Cyclotron Laboratory (NSCL) and fragmented on a 399 mg/cm^2 ^{9}Be production target. The secondary beam of ^{70}Se was selected using the A1900 fragment separator which then bombarded the 96 mg/cm^2 ^{9}Be secondary target housed at the target position of the S800 spectrograph. Reaction products were identified on an event-by-event basis from energy-loss and time-of-flight information using an ionization chamber and plastic scintillators, respectively. γ rays were measured by the SeGA array of segmented high-purity germanium detectors. Measured Eγ, Iγ, γ-ray line shapes. Deduced levels, lifetimes using the γ-ray line-shape method. Experimental results were compared with shell model calculations.

^{69}Se Levels

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	Comments
0.0	1/2$^-$		
39.0 *16*	5/2$^-$		
129.0 *14*	3/2$^-$	263 ps *12*	T$_{1/2}$: from lineshape analysis of 129γ. τ=380 ± *18* ps adopted from τ=380 ±*9* (stat) ±*16* (syst) ps (2015Ni01).
290.0 *16*	3/2$^-$	231 ps *11*	T$_{1/2}$: weighted average of 225 ps *11* from the lineshape analysis of 161γ and 250 ps *19* from the lineshape analysis of 251γ (2015Ni01).
713.0 *19*	5/2$^-$		
790.0 *19*			
915.0 *16*	7/2$^-$		
1123.0 *19*	7/2$^-$		

[†] From least-squares fit to Eγ data by the evaluator. No uncertainties are available for the Eγ data. The least-squares fit is performed with the assumption that the uncertainties are the same for all the Eγ data. The evaluator notes that the least-squares fit gave a reduced $\chi^2\approx0$ which could mean that the gammas provided by the authors may be modified from level energy difference and are not the actual measured values.

[‡] Lifetimes were extracted by comparing the experimental γ-ray lineshapes spectra after Doppler-broadening correction to GEANT simulations (2015Ni01). The effect of lifetimes on the Doppler-reconstructed lineshapes of γ-ray spectra at relativistic recoil energies is to cause γ emissions at different locations along the beam axis in the target, which results in different Doppler-broadening corrections that distort the lineshapes.

γ(^{69}Se)

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	Comments
90	33	129.0	3/2$^-$	39.0	5/2$^-$		
129	100	129.0	3/2$^-$	0.0	1/2$^-$		
161	51	290.0	3/2$^-$	129.0	3/2$^-$	(M1)	B(M1)↓=0.031 *3* (2015Ni01) Mult.: from Adopted Gammas.
251	17	290.0	3/2$^-$	39.0	5/2$^-$		
500	11	790.0		290.0	3/2$^-$		
[x]524 *3*							Eγ: Too weak for coincidence measurement, and hence could not be placed in the level scheme by 2015Ni01. Shell model calculations using GXPFIA interaction predict J=(1/2,3/2,5/2) (2015Ni01).
674	19	713.0	5/2$^-$	39.0	5/2$^-$		
786	14	915.0	7/2$^-$	129.0	3/2$^-$		
876	6	915.0	7/2$^-$	39.0	5/2$^-$		
1084	11	1123.0	7/2$^-$	39.0	5/2$^-$		

[x] γ ray not placed in level scheme.

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Level Scheme

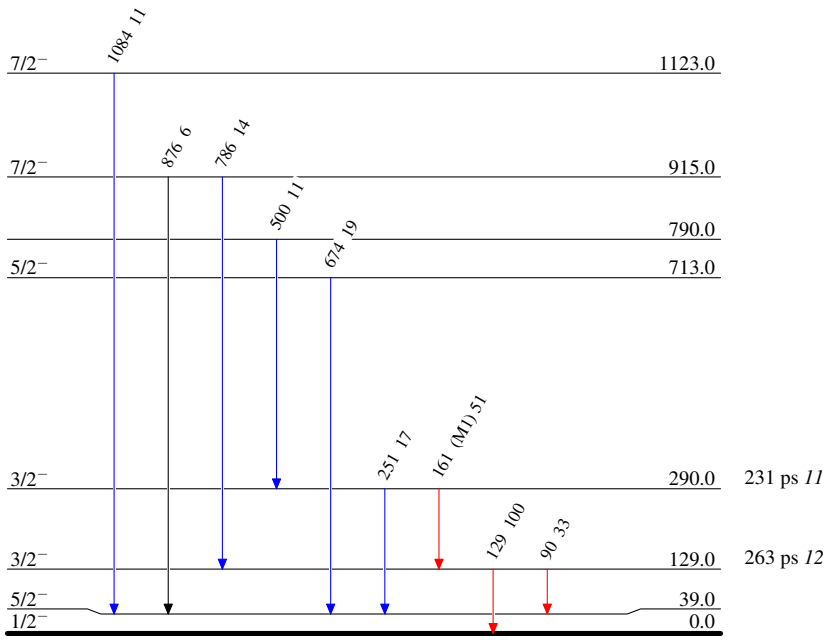
Intensities: Relative I_γ

Legend

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

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

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



$^{69}_{34}Se_{35}$