^{238}U(^{82}Se,^{84}Seγ) 2015Li42

Type	Author	History Citation	Literature Cutoff Date
Update	Balraj Singh	ENSDF	

2015Li42: States in ^{84}Se populated through 2n-transfer reaction. E(^{82}Se)=577 MeV provided by Tandem-XTU and ALPI superconducting LINAC at INFN-Legnaro. Target=2 mg/cm^2 thick evaporated on 1.2 mg/cm^2 thick Ta backing facing the beam. Measured Eγ, Iγ, (^{84}Se)γ-coin, level lifetimes by recoil-distance Doppler shift (RDDS) using Cologne Plunger device, in which a ^{93}Nb degrader foil of 4.1 mg/cm^2 thickness was mounted downstream for slowing down the projectile-like recoils. PRISMA magnetic spectrometer was used for mass separation using Bρ-ΔE-TOF method, and position information of recoils measured by micro-channel plate (MCP) detector and multiwire parallel-plate avalanche counters (MWPPAC). The AGATA demonstrator array of five triple clusters of 36-fold segmented HPGe detectors was used for the detection of Doppler-corrected γ-rays. Level lifetimes were extracted from (^{84}Se)γ-coin spectra generated with a condition on total kinetic energy loss (TKEL) of recoils, the latter generated from event-by-event analysis using relativistic two-body kinematics. Comparison with large-scale shell model calculations using several different effective interactions.

^{84}Se Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0	0$^+$		
1454.66 *10*	2$^+$	0.42 ps *6*	T$_{1/2}$: from B(E2)↑=0.105 *15* in 2010Ga14. The experiment in 2015Li42 is less sensitive to mean lifetimes of less than 1 ps. Upper limit of 0.7 ps half-life is suggested by 2015Li42.
2121.65 *12*	4$^+$	20.2 ps *+41−26*	
2984.85 *16*	2$^+$		J$^\pi$: from ^{84}Se Adopted Levels.
3370.53 *18*	6$^+$	8.2 ps *+17−39*	T$_{1/2}$: from method 2, as described for ^{86}Se in 2015Li42; the lower uncertainties of 1.8 (stat) and 3.4 (syst) are combined in quadrature by compiler. Other T$_{1/2}$=8.7 ps *+31−44* from authors′ method 1, same as used for half-life of the 4$^+$ state in ^{86}Se.
3408.71? *16*			
3439.60 *16*			
3536.95 *21*	5$^+$		
3701.65 *24*	6$^+$		A 164.18 keV *21* γ with a branching of 29% from this level and known from previous experimental work is not discussed by 2015Li42.
4637.5?			

[†] From Eγ values.
[‡] From 2015Li42 unless otherwise stated.
[#] From RDDS, plunger method (2015Li42), unless otherwise stated.

γ(^{84}Se)

E$_\gamma$[†]	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[†]	Comments
666.99 *7*	100	2121.65	4$^+$	1454.66	2$^+$	E2	B(E2)↓=0.0219 *+34−38* (2015Li42) B(E2)(W.u.)=10.0 *+16−17*
1248.88 *13*	13 *3*	3370.53	6$^+$	2121.65	4$^+$	[E2]	B(E2)↓=0.0023 *+18−4* (2015Li42) B(E2)(W.u.)=1.1 *+8−2* B(E2) value from method 2 in 2015Li42. B(E2)=0.0022 *+22−6* from authors′ method 1.
1267	≈2	4637.5?		3370.53	6$^+$		Weak peak in γ spectrum of 2015Li42. This peak corresponds to 1270γ feeding the first 6$^+$ state, as reported by 2013DrZY or Doppler-shifted peak of 1287γ from 3408 level feeding the first 4$^+$ state, or a mixture of the contribution from both.
1287.06[‡] *10*		3408.71?		2121.65	4$^+$		See comment for 1267γ from 4637 level.
1317.95 *10*		3439.60		2121.65	4$^+$		An unidentified 1317 peak shown in Figure 6 of 2015Li42.
1415.30 *17*	52 *3*	3536.95	5$^+$	2121.65	4$^+$		

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$^{238}U(^{82}Se,^{84}Se\gamma)$ 2015Li42 (continued)

$\gamma(^{84}Se)$ (continued)

E_γ †	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. †	Comments
1454.66 *10*		1454.66	2^+	0.0	0^+	E2	B(E2)↓=0.0210 *30* (2010Ga14) B(E2)(W.u.)=9.6 *14*
1530.19 *14*		2984.85	2^+	1454.66	2^+		An unidentified 1530 peak shown in Figure 6 of 2015Li42.
1580.00 *21*	27 *3*	3701.65	6^+	2121.65	4^+		

† From ^{84}Se Adopted dataset, unless otherwise stated.
‡ Placement of transition in the level scheme is uncertain.

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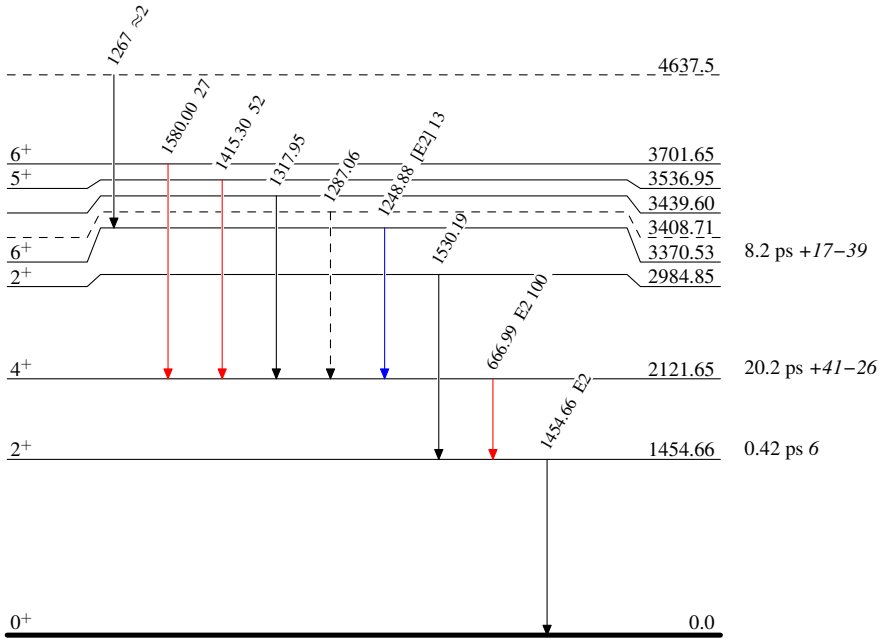
Level Scheme

Intensities: Relative I_γ

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



$^{84}_{34}Se_{50}$