^{77}Se(p,nγ) 1988Fe07,1977Fe13,1975Mo20

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Sep-2020

1988Fe07, 1977Fe13 (both from the same group): E=2.5-3.5 MeV measured γ, nγ coin., γ(θ), γ(excitation function). Data compared with statistical model calculations. See also 1984Fe05 from the same group. 1977Fe13 give data for levels below 500 and 1988Fe07 provide data for levels above 500 keV.

1975Mo20: E=2.15-2.85 MeV. Measured γ, γγ, γ(excitation function).

$J^\pi(^{77}Se\ g.s.)=1/2^-$.

^{77}Br Levels

The level scheme is from 1975Mo20 below 500 keV, and from 1988Fe07 above this energy.

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	$3/2^-$#		
105.8 *4*	$9/2^+$#	4.28 min *10*	%IT=100 $T_{1/2}$: from the Adopted Levels.
129.7 *3*	$5/2^+$#		
161.9 *4*	$5/2^-$		
166.6 *3*	$1/2^-$,$3/2^-$		Jπ: $(3/2)^-$ in the Adopted Levels.
226.6 *3*	$3/2^-$		
276.1 *4*	$(3/2)^+$		
336.7 *3*	$1/2^-$,$3/2^-$		
417.8 *5*	$7/2^{(+)}$		
425.1 *4*	$5/2^-$		
471.1 *4*	$3/2^-$		
575.2 *4*	$7/2^-$		
715.7 *4*	$5/2^{(-)}$		
770.9 *6*	$1/2^+$		Jπ: $(1/2^+)$ in the Adopted Levels.
782.0 *5*	$(9/2)^+$		
790.1 *7*	$(9/2)^-$		
831.5 *4*	$1/2^-$,$3/2^-$		
864.6 *4*	$(3/2^+)$		Jπ: excitation function data also permits $1/2^+$.
886.9 *4*	$1/2^-$,$3/2^-$		
967.1 *5*	$(7/2^+)$		
969.5 *5*	$(5/2^+)$		Jπ: $(5/2)^+$ in the Adopted Levels.
1024.4 *5*	$(5/2)^+$		
1097.8 *5*	$(5/2^+,7/2)$		Jπ: excitation function data supports 7/2, but the analysis is complicated by the presence of impurity lines.
1127.9 *4*	(1/2,3/2)		

† From least-squares fit to Eγ data.

‡ From excitation function data (1988Fe07,1977Fe13), unless otherwise stated. Assignments that are different in the Adopted Levels are noted in comments.

From the Adopted Levels, unless otherwise stated.

^{77}Se(p,nγ) 1988Fe07,1977Fe13,1975Mo20 (continued)

γ(^{77}Br)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	Comments
105.8	$9/2^+$	105.8 *5*		0.0	$3/2^-$	E3	Mult.: from the Adopted dataset. Eγ=105.8 *5*, Iγ=1.3 *5* (1975Mo20, at E(p)=2.8 MeV).
129.7	$5/2^+$	129.7 *5*		0.0	$3/2^-$		Eγ=129.7 *5*, Iγ=63 *6* (1975Mo20, at E(p)=2.8 MeV).
161.9	$5/2^-$	161.9 *5*		0.0	$3/2^-$		A_2=−0.42 *4*; A_4=+0.11 *4* (1977Fe13) Eγ=162.1 *5*, Iγ=31 *5* (1975Mo20, at E(p)=2.8 MeV). δ=−0.27 *10* or −1.6 *4* from γ(θ).
166.6	$1/2^-,3/2^-$	166.6 *5*		0.0	$3/2^-$		A_2=+0.04 *5*; A_4=+0.01 *5* (1977Fe13) Eγ=167.0 *5*, Iγ=100 *5* (1975Mo20, at E(p)=2.8 MeV).
226.6	$3/2^-$	60.0 *5*	50 *9*	166.6	$1/2^-,3/2^-$		Eγ=59.6 *5*, Iγ=17 *3* (1975Mo20, at E(p)=2.8 MeV).
		226.6 *5*	50 *9*	0.0	$3/2^-$		Eγ=226.6 *5*, Iγ=17 *3* (1975Mo20, at E(p)=2.8 MeV). γ(θ) is isotropic (1977Fe13).
276.1	$(3/2)^+$	146.4 *5*	92 *9*	129.7	$5/2^+$		A_2=−0.12 *3*; A_4=+0.04 *3* (1977Fe13) Eγ=146.6 *5*, Iγ=39 *4* (1975Mo20, at E(p)=2.8 MeV). δ=−0.87 *30* or −5.7 *37* from γ(θ).
		276.1 *5*	8 *2*	0.0	$3/2^-$		Eγ=276.0 *5*, Iγ=3.4 *10* (1975Mo20, at E(p)=2.8 MeV).
336.7	$1/2^-,3/2^-$	170.0 *5*	10 *6*	166.6	$1/2^-,3/2^-$		Eγ=169.9 *5*, Iγ=3.3 *20* (1975Mo20, at E(p)=2.8 MeV).
		336.9 *5*	90 *12*	0.0	$3/2^-$		A_2=−0.013 *19*; A_4=+0.001 *20* (1977Fe13) Eγ=336.9 *5*, Iγ=30 *4* (1975Mo20, at E(p)=2.8 MeV). δ=−0.32 *20* or infinity from γ(θ).
417.8	$7/2^{(+)}$	312.1 *5*		105.8	$9/2^+$		A_2=−0.235 *17*; A_4=+0.048 *17* (1977Fe13) Eγ=312.2 *5*, Iγ=3.3 *10* (1975Mo20, at E(p)=2.8 MeV). δ=+0.10 *5* or infinity from γ(θ).
425.1	$5/2^-$	258.5 *5*	15 *8*	166.6	$1/2^-,3/2^-$		Eγ=258.0 *5*, Iγ=1.2 *6* (1975Mo20, at E(p)=2.8 MeV).
		425.1 *5*	85 *25*	0.0	$3/2^-$		A_2=+0.194 *10*; A_4=+0.025 *10* (1977Fe13) Eγ=425.1 *5*, Iγ=6.8 *20* (1975Mo20, at E(p)=2.8 MeV). δ=+0.58 *3* or +4.3 *10* from γ(θ).
471.1	$3/2^-$	244.5 *5*	58 *21*	226.6	$3/2^-$		Eγ=244.4 *5*, Iγ=11 *4* (1975Mo20, at E(p)=2.8 MeV).
		304.5 *5*	20 *5*	166.6	$1/2^-,3/2^-$		Eγ=304.1 *5*, Iγ=3.9 *10* (1975Mo20, at E(p)=2.8 MeV).
		471.1 *5*	22 *5*	0.0	$3/2^-$		A_2=−0.027 *19*; A_4=+0.005 *20* (1977Fe13) Eγ=471.1 *5*, Iγ=4.2 *10* (1975Mo20, at E(p)=2.8 MeV). δ=−0.38 *20* or −8.1 *42* from γ(θ).
575.2	$7/2^-$	413.3 *5*	27 *5*	161.9	$5/2^-$		
		575.2 *5*	73 *15*	0.0	$3/2^-$		
715.7	$5/2^{(-)}$	489.1 *5*	19 *4*	226.6	$3/2^-$		
		715.7 *5*	81 *16*	0.0	$3/2^-$		A_2=−0.36 *3*; A_4=+0.04 *3* (1988Fe07) δ=−0.19 *+4−7* or −1.7 *2* from γ(θ).
770.9	$1/2^+$	494.8[#] *5*		276.1	$(3/2)^+$		γ(θ): isotropic distribution for the doublet.
782.0	$(9/2)^+$	652.3 *5*	25 *5*	129.7	$5/2^+$		
		676.3 *5*	75 *15*	105.8	$9/2^+$		A_2=+0.24 *4*; A_4=+0.05 *4* (1988Fe07)
790.1	$(9/2)^-$	628.2 *5*		161.9	$5/2^-$		
831.5	$1/2^-,3/2^-$	494.8[#] *5*		336.7	$1/2^-,3/2^-$		
		604.8[@] *5*		226.6	$3/2^-$		
		664.9[@] *5*		166.6	$1/2^-,3/2^-$		
		669.5[@] *5*		161.9	$5/2^-$		
		831.4 *5*	40 *8*	0.0	$3/2^-$		
864.6	$(3/2^+)$	588.4 *5*	22 *4*	276.1	$(3/2)^+$		
		734.9 *5*	70 *14*	129.7	$5/2^+$		
		864.6 *5*	8 *2*	0.0	$3/2^-$		
886.9	$1/2^-,3/2^-$	720.2 *5*	35 *7*	166.6	$1/2^-,3/2^-$		
		886.9 *5*	65 *13*	0.0	$3/2^-$		
967.1	$(7/2^+)$	837.4 *5*	43 *9*	129.7	$5/2^+$		
		861.4 *5*	57 *11*	105.8	$9/2^+$		
969.5	$(5/2^+)$	551.7[@] *5*		417.8	$7/2^{(+)}$		
		693.3[@] *5*		276.1	$(3/2)^+$		

Continued on next page (footnotes at end of table)

^{77}Se(p,nγ) 1988Fe07,1977Fe13,1975Mo20 (continued)

γ(^{77}Br) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Comments
969.5	(5/2$^+$)	839.7[@] *5*		129.7	5/2$^+$	
		969.5 *5*		0.0	3/2$^-$	A_2=−0.37 *2*; A_4=−0.04 *2* (1988Fe07) δ=−0.25 *4* or −1.61 *13* from $\gamma(\theta)$.
1024.4	(5/2)$^+$	606.6 *5*	74 *15*	417.8	7/2$^{(+)}$	
		748.3 *5*	6 *2*	276.1	(3/2)$^+$	
		894.7 *5*	20 *4*	129.7	5/2$^+$	
1097.8	(5/2$^+$,7/2)	968.1 *5*	25 *5*	129.7	5/2$^+$	
		992.1 *5*	75 *15*	105.8	9/2$^+$	
1127.9	(1/2,3/2)	791.2 *5*	25 *5*	336.7	1/2$^-$,3/2$^-$	
		901.2 *5*	12 *3*	226.6	3/2$^-$	
		1127.8 *5*	63 *13*	0.0	3/2$^-$	

[†] From 1988Fe07. Values for levels below 500 keV are close in energy to those from 1975Mo20. Uncertainty of 0.5 keV assigned by the evaluator.

[‡] Photon branching ratios. For levels below 500, values are from 1975Mo20, and above this energy from 1988Fe07. For values taken from 1988Fe07, 20% uncertainty assigned by the evaluator. Relative γ-ray intensities from 1975Mo20 are listed under comments.

[#] Multiply placed.

[@] Placement of transition in the level scheme is uncertain.

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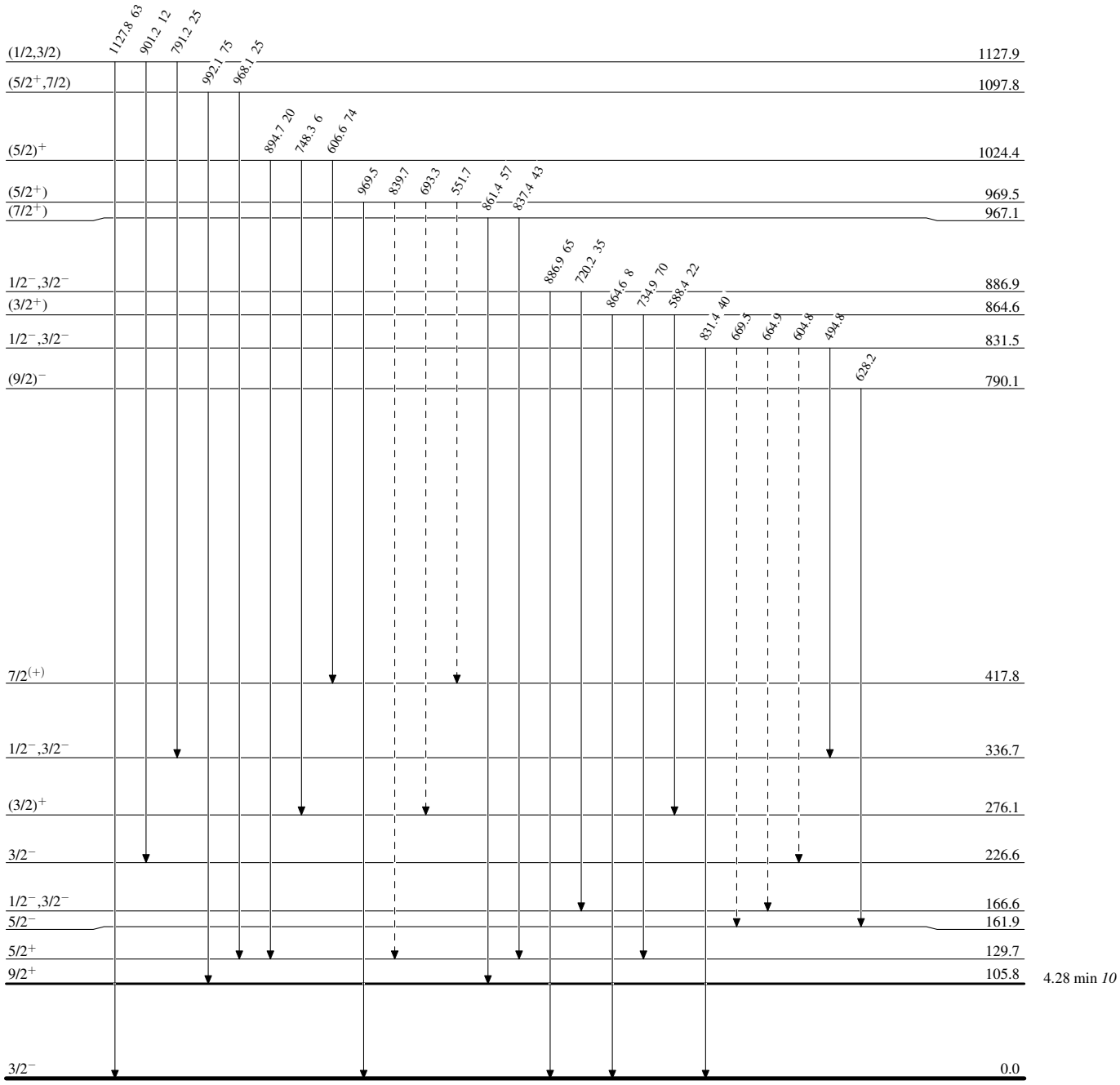
Legend

Level Scheme

Intensities: % photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{77}_{35}Br_{42}$

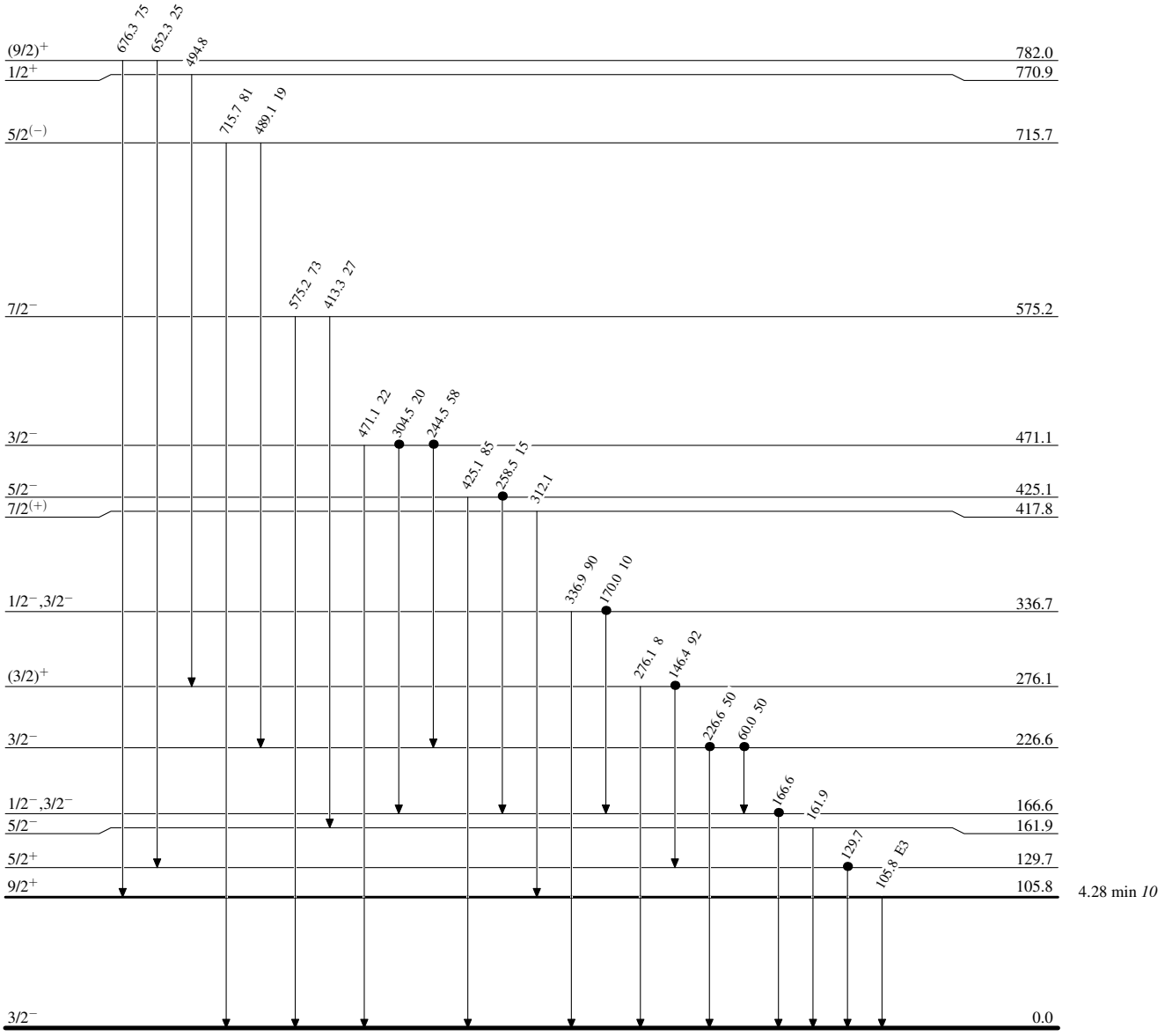
^{77}Se(p,nγ) 1988Fe07,1977Fe13,1975Mo20

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

● Coincidence



$^{77}_{35}Br_{42}$