^{82}Se(^{9}Be,5nγ) 2014Li25

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alexandru Negret, Balraj Singh	NDS 124, 1 (2015)	30-Nov-2014

2014Li25: E(^{9}Be)=40-53 MeV. Target=0.85 mg/cm^2 thick enriched ^{82}Se foil with 4.5 mg/cm^2 thick gold backing. Measured Eγ, Iγ, excitation functions at E=40, 44, 46, 48, 52 and 53 MeV, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$(DCO) using an array of nine BGO-Compton suppressed HPGe detectors, one Clover Ge detector, and two planar HPGe detectors at CIAE′s HI-13 tandem accelerator facility. Deduced levels, J, π, multipolarity, particle configurations. Comparison with detailed shell-model calculations, assuming ^{56}Ni as an inert core and 1f$_{5/2}$, 2p$_{3/2}$, 2p$_{1/2}$ and 1g$_{9/2}$ orbitals for proton and neutron excitations.

^{86}Sr Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	Comments
0.0[#]	0$^+$		
1076.6[#] 2	2$^+$		
1854.9 4	2$^+$		
2229.7[#] 3	4$^+$		
2482.6[c] 4	3$^-$		
2672.8[c] 4	5$^-$		
2857.4[#] 4	6$^+$		
2956.1[#] 4	8$^+$	0.455 μs 7	%IT=100 T$_{1/2}$: from Adopted Levels.
3055.8[c] 5	(6$^-$)		J$^\pi$: 5$^-$ in Adopted Levels.
3291.7[c] 5	(7$^-$)		J$^\pi$: 6$^-$ in Adopted Levels.
3664.4[c] 4	(7$^-$)		
3782.5[a] 4	(6$^+$)		
4154.4[a] 4	(8$^+$)		
4709.2[#] 5	(10$^+$)		
4924.0 7			
4976.3[a] 5	(10$^+$)		
5013.0[&] 7	(11$^-$)		
5543.9[b] 6	(9$^-$)		
5834.7[@] 5	(11$^-$)		
5847.9[b] 8			
5983.6 8			
6040.6[&] 9	(12$^-$)		
6041.7[b] 9			
6061.4[@] 5	(12$^-$)		
6191.2[@] 6	(13$^-$)		
6205.1[a] 6	(12$^+$)		
6689.1[&] 10	(13$^-$)		
6762.2[@] 8	(14$^-$)		
7461.8[@] 9			
7640.5[a] 7	(14$^+$)		
8158.8?[@] 11			

† From least-squares fit to Eγ data.

‡ As proposed by 2014Li25 based on $\gamma\gamma(\theta)$(DCO) data, sequences of $\gamma\gamma$ cascades, and systematics of neighboring nuclides. See also Adopted Levels.

Band(A): Yrast sequence.

Continued on next page (footnotes at end of table)

$^{82}Se(^{9}Be,5n\gamma)$ 2014Li25 (continued)

^{86}Sr Levels (continued)

[@] Band(B): γ cascade based on (11^-), 5834.7.
[&] Band(C): γ cascade based on (11^-), 5013.0.
[a] Band(D): γ cascade based on (6^+).
[b] Band(E): γ cascade based on (9^-).
[c] Band(F): γ cascade based on 3^-.

$\gamma(^{86}Sr)$

DCO(1) and DCO(2) are for gates on stretched dipole and stretched quadrupole transitions, respectively. Expected DCO ratios are: 1.6 for stretched quadrupole and 1.0 for stretched dipole when gated on stretched dipole; 1.0 for stretched quadrupole and 0.7 for stretched dipole when gated on stretched quadrupole.

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[a]	Comments
98.7 2	46.4 11	2956.1	8^+	2857.4	6^+	E2	1.068	DCO(2)=1.05 7
129.8 2	15.3 4	6191.2	(13^-)	6061.4	(12^-)	D+Q		DCO(2)=0.54 4
184.6 5	1.6 1	2857.4	6^+	2672.8	5^-	D		DCO(1)=1.21 11
190.2 5	2.9 1	2672.8	5^-	2482.6	3^-			
193.8 5	2.5 3	6041.7		5847.9				
226.7 2	18.3 4	6061.4	(12^-)	5834.7	(11^-)	D+Q		DCO(1)=1.09 3; DCO(2)=0.59 4
235.9 5	2.8 1	3291.7	(7^-)	3055.8	(6^-)	D+Q		DCO(2)=0.51 6
303.8 5	1.6 1	5013.0	(11^-)	4709.2	(10^+)	D		DCO(2)=0.53 5
304.0 5	3.2 4	5847.9		5543.9	(9^-)			
371.9 3	5.2 3	4154.4	(8^+)	3782.5	(6^+)	Q		DCO(2)=0.91 6
372.7 5	2.6 1	3664.4	(7^-)	3291.7	(7^-)	D+Q		DCO(1)=1.23 6
383.0 5	1.9 1	3055.8	(6^-)	2672.8	5^-	D+Q		DCO(1)=0.74 8
443.1 3	13.1 3	2672.8	5^-	2229.7	4^+	D		DCO(1)=0.77 6; DCO(2)=0.57 8
490.0 2	26.9 5	4154.4	(8^+)	3664.4	(7^-)	D		DCO(1)=0.88 5; DCO(2)=0.67 4
567.6 5	≈0.8	5543.9	(9^-)	4976.3	(10^+)			
571.0[@] 5	4.3 2	6762.2	(14^-)	6191.2	(13^-)	D+Q		DCO(1)=0.81 6
618.9 5	1.3 1	3291.7	(7^-)	2672.8	5^-			
627.7[b] 3	5.1[b] 1	2482.6	3^-	1854.9	2^+			
627.7[b] 2	50.3[b] 4	2857.4	6^+	2229.7	4^+	Q		DCO(1)=1.95 5; DCO(2)=1.05 2
648.5[@] 5	≈0.8	6689.1	(13^-)	6040.6	(12^-)	D+Q		DCO(1)=0.84 18; DCO(2)=0.42 11
697.0[#c] 5		8158.8?		7461.8				
699.5[#@] 5		7461.8		6762.2	(14^-)			
778.3 5	1.4 1	1854.9	2^+	1076.6	2^+			
807.0 3	13.1 3	3664.4	(7^-)	2857.4	6^+	D		DCO(1)=0.92 4; DCO(2)=0.68 6
821.9 3	12.8 3	4976.3	(10^+)	4154.4	(8^+)	Q		DCO(1)=1.96 7; DCO(2)=1.27 4
826.1 5	2.4 1	3055.8	(6^-)	2229.7	4^+	[M2+E3]		
925.1 5	1.4 1	3782.5	(6^+)	2857.4	6^+			
1027.6[@] 5	1.8 1	6040.6	(12^-)	5013.0	(11^-)	D+Q		DCO(1)=1.13 8
1059.6 5	≈0.8	5983.6		4924.0				
1076.6 2	100	1076.6	2^+	0.0	0^+	Q		DCO(1)=1.68 4; DCO(2)=0.99 1
1125.5 2	24.9 6	5834.7	(11^-)	4709.2	(10^+)	D		DCO(2)=0.53 6
1153.1 2	75.6 12	2229.7	4^+	1076.6	2^+	Q		DCO(1)=1.60 4; DCO(2)=1.07 2
1198.3 3	7.5 4	4154.4	(8^+)	2956.1	8^+	D+Q		DCO(2)=0.55 3
1228.8 3	11.5 3	6205.1	(12^+)	4976.3	(10^+)			DCO(2)=0.76 5
1259.6 5	4.4 2	4924.0		3664.4	(7^-)			
1297.0 5	2.2 1	4154.4	(8^+)	2857.4	6^+	Q		DCO(2)=0.88 13
1389.5 5	1.5 1	5543.9	(9^-)	4154.4	(8^+)	D		DCO(2)=0.36 16
1435.3 3	5.0 2	7640.5	(14^+)	6205.1	(12^+)	(Q)		DCO(2)=0.83 10
1552.8 5	3.8 2	3782.5	(6^+)	2229.7	4^+	Q		DCO(2)=0.94 10

Continued on next page (footnotes at end of table)

^{82}Se(^{9}Be,5nγ) 2014Li25 (continued)

γ(^{86}Sr) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	Comments
1753.1 *2*	40.8 *9*	4709.2	(10$^+$)	2956.1	8$^+$	Q	DCO(2)=1.00 *5*
1854.9 *5*	2.5 *2*	1854.9	2$^+$	0.0	0$^+$		

[†] 2014Li25 state uncertainty of 0.2-0.5 keV depending on intensity. Evaluators assign 0.2 keV for Iγ>15, 0.3 keV for Iγ=5-15, and 0.5 keV for Iγ<5, and when Iγ not given.

[‡] At E(^{9}Be)=53 MeV.

[#] 697.0g and 699.5γ form a doublet.

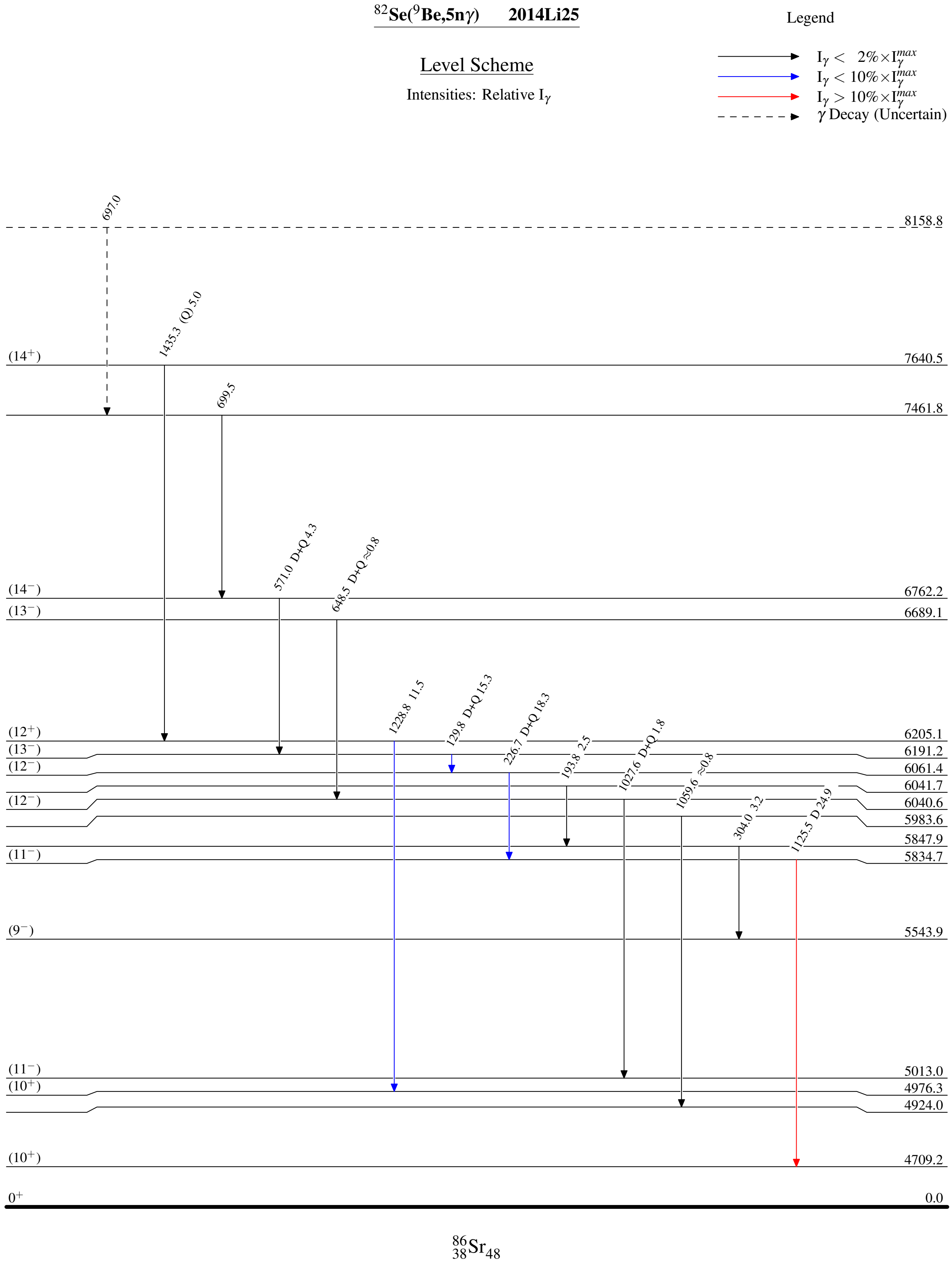
[@] 699.5-571.0 and 648.5-1027.6 γ cascades are reversed in 2014KuZZ; orderings from 2014KuZZ given in the Adopted dataset.

[&] Based on $\gamma\gamma(\theta)$(DCO) data in 2014Li25. Mult=Q refer to stretched quadrupoles (most likely E2), mult=D to stretched dipoles (most likely E1) and mult=D+Q to ΔJ=1, mixed transitions, most likely M1+E2.

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

[b] Multiply placed with intensity suitably divided.

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



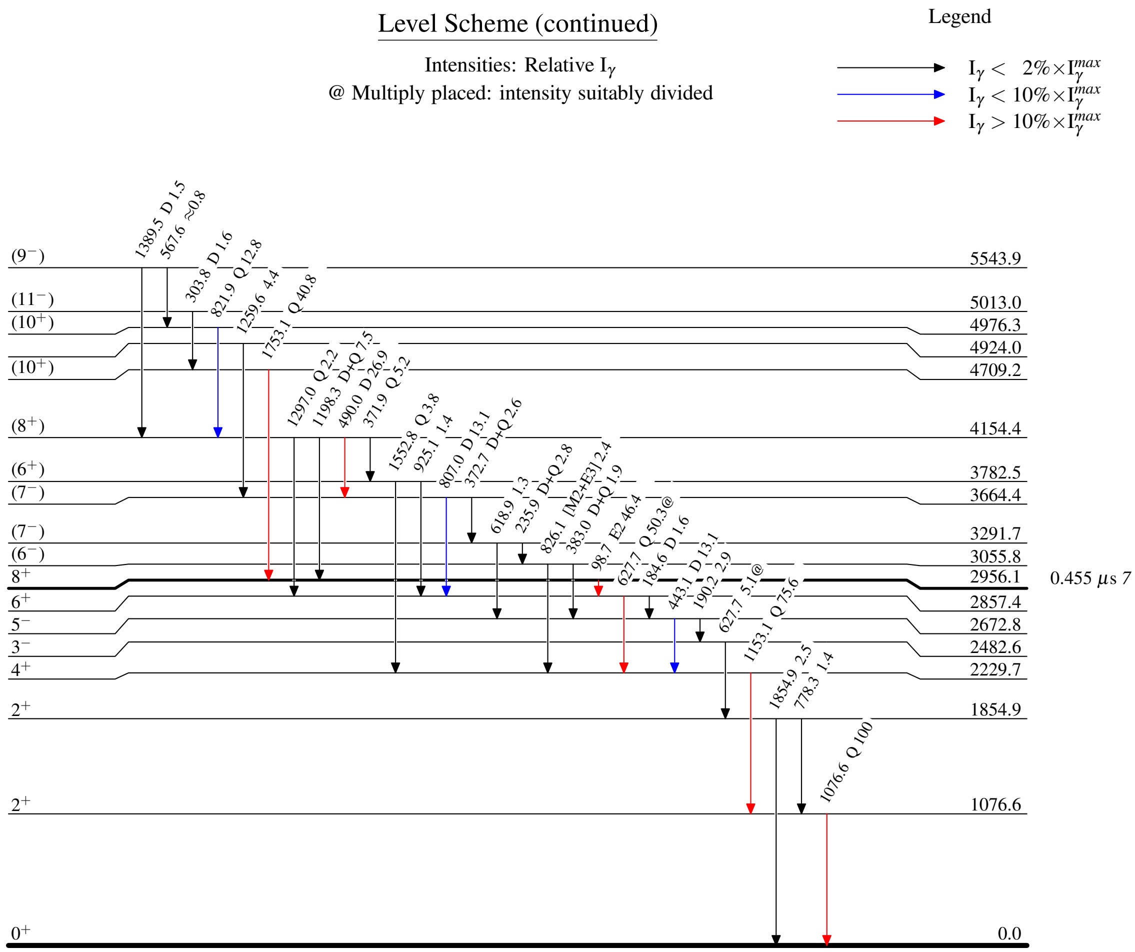
^{82}Se(^{9}Be,5nγ) 2014Li25
Level Scheme
Intensities: Relative I_γ
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)
697.0
8158.8
1435.3 (Q) 5.0
(14$^+$) 7640.5
699.5
7461.8
571.0 D+Q 4.3
648.5 D+Q ≈0.8
(14$^-$) 6762.2
(13$^-$) 6689.1
1228.8 11.5
129.8 D+Q 15.3
226.7 D+Q 18.3
193.8 2.5
1027.6 D+Q 1.8
1059.6 ≈0.8
304.0 3.2
1125.5 D 24.9
(12$^+$) 6205.1
(13$^-$) 6191.2
(12$^-$) 6061.4
6041.7
(12$^-$) 6040.6
5983.6
5847.9
(11$^-$) 5834.7
(9$^-$) 5543.9
(11$^-$) 5013.0
(10$^+$) 4976.3
4924.0
(10$^+$) 4709.2
0$^+$ 0.0
$^{86}_{38}Sr_{48}$

^{82}Se(^{9}Be,5nγ) 2014Li25

Level Scheme (continued)

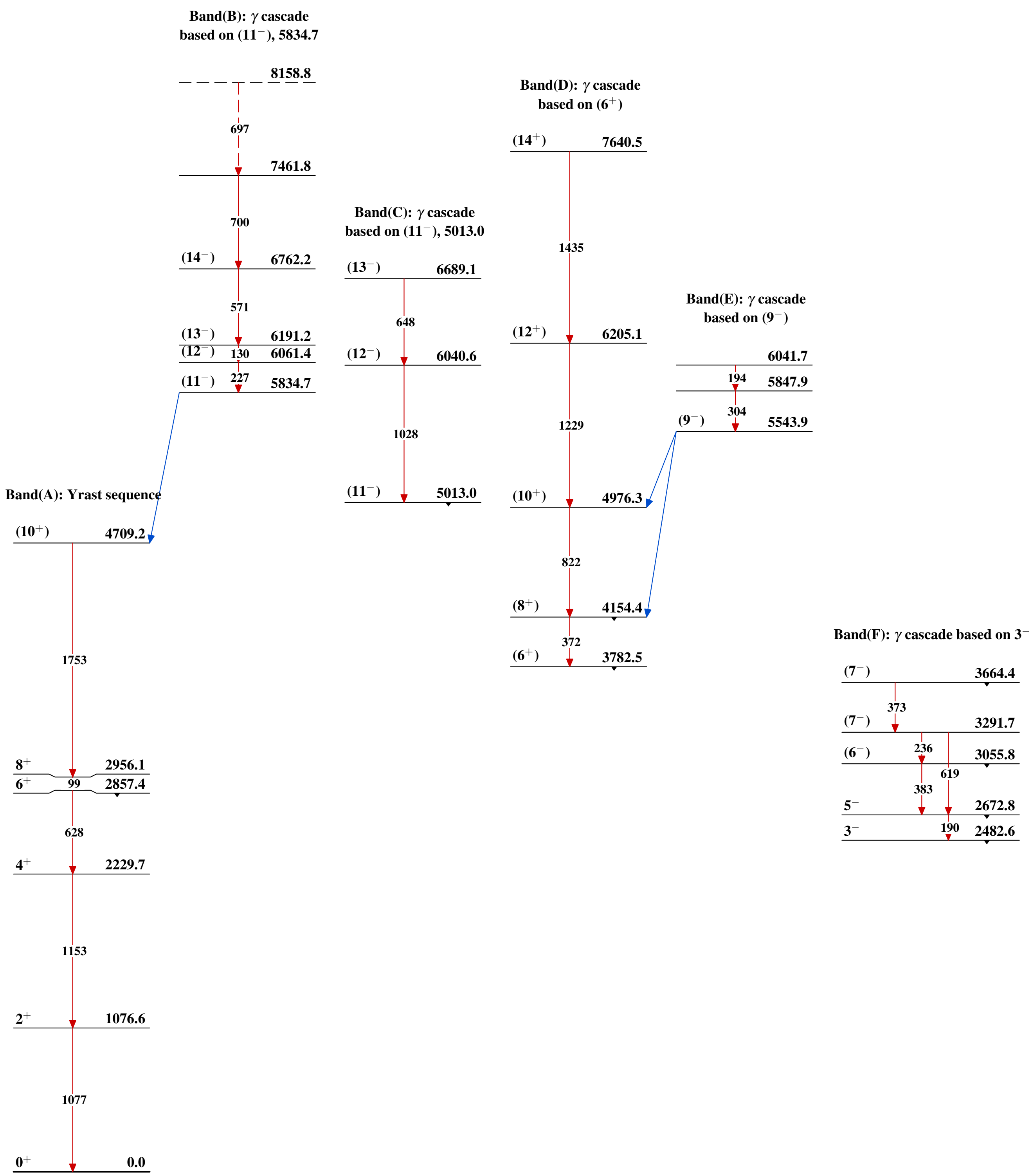
Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



$^{86}_{38}Sr_{48}$

$^{82}Se(^{9}Be,5n\gamma)$ **2014Li25**



$^{86}_{38}Sr_{48}$