

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS	121, 561 (2014)	31-Mar-2014

$Q(\beta^-) = -8330$ 60; $S(n) = 9470$ 50; $S(p) = 3061$ 21; $Q(\alpha) = 7151$ 3 [2012Wa38](#)

 ^{210}Ra LevelsCross Reference (XREF) Flags

- A** ^{214}Th α decay
B $^{174}\text{Yb}(^{40}\text{Ar}, 4n\gamma)$
C $^{184}\text{W}(^{30}\text{Si}, 4n\gamma)$
D $^{204}\text{Pb}(^{12}\text{C}, 6n\gamma)$

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0	0 ⁺	3.7 s 2	ABCD	$\% \alpha \approx 96$; $\% \varepsilon + \% \beta^+ \approx 4$ $\% \varepsilon + \% \beta^+$ has not been observed. Branching is from gross β decay theory (1973Ta30). T _{1/2} : av: 3.8 s 2 (1967Va22), 3.6 s 2 (1968Lo15). Measured isotope shifts: 1988Ah02 , 1987We03 , 1983Ah03 .
603.7 [#] 3	2 ⁺		BCD	
1205.1 4	4 ⁺		BCD	
1377.8 [#] 4	4 ⁺		BCD	
1955.2 [#] 5	6 ⁺		BCD	
2050.9 [@] 7	8 ⁺	2.1 μs 1	BCD	T _{1/2} : from γ - γ (t) (2004Re04 -($^{30}\text{Si}, 4n\gamma$)), also same value in 2013Ba29 – measurement detail not mentioned. Others: 2.36 μs 5 (2004He25 -($^{12}\text{C}, 6n\gamma$)), 2.24 μs (1999Co13 -($^{40}\text{Ar}, 4n\gamma$)), ~ 2 μs (2005YeZZ). Measured isomeric ratio, R _{exp} % = Observed decay yield/number of implanted ions, of 31 2 (2013Ba29) from $^9\text{Be}(^{238}\text{U}, X)$ projectile fragmentation reaction, E=1 GeV/nucleon.
2268.4 [@] 8	(9 ⁺)		C	
2575.1 [@] 9	(10 ⁺)		C	
3093.4 [@] 10	(12 ⁺)		C	
3263.0 ^{&} 10	(12 ⁺)		C	
3898.5 ^{&} 11	(14 ⁺)		C	
4257.0 ^{&} 12	(16 ⁺)		C	

[†] From least-squares fit to adopted γ -ray energies.

[‡] Spin and parity suggested in ($^{30}\text{Si}, 4n\gamma$) – [2004Re04](#) from comparison with neighboring even-even Po, Rn, and Ra nuclides with 126 neutrons and γ -ray multipolarity.

[#] Band(A): γ -sequence based on g.s..

[@] Band(B): Band based on 8⁺ isomer.

[&] Band(C): γ -sequence based on (12⁺).

Adopted Levels, Gammas (continued)

$\gamma(^{210}\text{Ra})$								Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. ‡	$\alpha^\#$	
603.7	2 ⁺	603.7 3	100	0.0	0 ⁺	E2	0.0252	$\alpha(\text{K})=0.01757$ 25; $\alpha(\text{L})=0.00568$ 8; $\alpha(\text{M})=0.001438$ 21 $\alpha(\text{N})=0.000379$ 6; $\alpha(\text{O})=8.39\times 10^{-5}$ 12; $\alpha(\text{P})=1.358\times 10^{-5}$ 20; $\alpha(\text{Q})=6.28\times 10^{-7}$ 9 E_γ : Weighted average of 603.5 6 (2004Re04) and 603.4 5 (2005Re02) from ($^{30}\text{Si}, 4n\gamma$) and 604.5 6 (2004He25) from ($^{12}\text{C}, 6n\gamma$).
1205.1	4 ⁺	601.3 3	100	603.7	2 ⁺	E2	0.0254	$\alpha(\text{K})=0.01770$ 25; $\alpha(\text{L})=0.00574$ 8; $\alpha(\text{M})=0.001455$ 21 $\alpha(\text{N})=0.000384$ 6; $\alpha(\text{O})=8.49\times 10^{-5}$ 12; $\alpha(\text{P})=1.373\times 10^{-5}$ 20; $\alpha(\text{Q})=6.34\times 10^{-7}$ 9 E_γ : Weighted average of 601.2 5 (2004Re04) and 600.5 6 (2005Re02) from ($^{30}\text{Si}, 4n\gamma$) and 602.1 6 (2004He25) from ($^{12}\text{C}, 6n\gamma$).
1377.8	4 ⁺	774.2 3	100	603.7	2 ⁺	E2	0.01490	$\alpha(\text{K})=0.01106$ 16; $\alpha(\text{L})=0.00288$ 4; $\alpha(\text{M})=0.000716$ 10 $\alpha(\text{N})=0.000189$ 3; $\alpha(\text{O})=4.21\times 10^{-5}$ 6; $\alpha(\text{P})=6.96\times 10^{-6}$ 10; $\alpha(\text{Q})=3.85\times 10^{-7}$ 6 E_γ : Weighted average of 773.7 5 (2004Re04) and 773.9 5 (2005Re02) from ($^{30}\text{Si}, 4n\gamma$) and 774.6 4 (2004He25) from ($^{12}\text{C}, 6n\gamma$).
1955.2	6 ⁺	577.5 3	100 5	1377.8	4 ⁺	E2	0.0278	$\alpha(\text{K})=0.0191$ 3; $\alpha(\text{L})=0.00646$ 10; $\alpha(\text{M})=0.001642$ 24 $\alpha(\text{N})=0.000433$ 7; $\alpha(\text{O})=9.56\times 10^{-5}$ 14; $\alpha(\text{P})=1.542\times 10^{-5}$ 22; $\alpha(\text{Q})=6.87\times 10^{-7}$ 10 E_γ : Weighted average of 577.1 5 (2004Re04) and 577.1 5 (2005Re02) from ($^{30}\text{Si}, 4n\gamma$) and 578.0 4 (2004He25) from ($^{12}\text{C}, 6n\gamma$).
		750.0 3	59 3	1205.1	4 ⁺	E2	0.01589	E_γ, I_γ : Other: 577.1 5, $I_\gamma=100$ 12 (scaled to 100 (577 γ) by evaluator) (2005Re02). $\alpha(\text{K})=0.01172$ 17; $\alpha(\text{L})=0.00313$ 5; $\alpha(\text{M})=0.000780$ 11 $\alpha(\text{N})=0.000206$ 3; $\alpha(\text{O})=4.58\times 10^{-5}$ 7; $\alpha(\text{P})=7.55\times 10^{-6}$ 11; $\alpha(\text{Q})=4.09\times 10^{-7}$ 6 E_γ : Weighted average of 749.7 5 (2004Re04) and 749.4 5 (2005Re02) from ($^{30}\text{Si}, 4n\gamma$) and 750.5 4 (2004He25) from ($^{12}\text{C}, 6n\gamma$).
2050.9	8 ⁺	95.7 5	100	1955.2	6 ⁺	E2	11.7 4	I_γ : Other: 52.9 19 ($^{12}\text{C}, 6n\gamma$). $\alpha(\text{L})=8.60$ 25; $\alpha(\text{M})=2.34$ 7 $\alpha(\text{N})=0.618$ 18; $\alpha(\text{O})=0.131$ 4; $\alpha(\text{P})=0.0190$ 6; $\alpha(\text{Q})=6.44\times 10^{-5}$ 15 $B(\text{E}2)(\text{W.u.})=0.0357$ 23
2268.4	(9 ⁺)	217.5 5	100	2050.9	8 ⁺	(M1)	1.73 3	$\alpha(\text{K})=1.391$ 22; $\alpha(\text{L})=0.257$ 4; $\alpha(\text{M})=0.0613$ 10 $\alpha(\text{N})=0.01617$ 25; $\alpha(\text{O})=0.00369$ 6; $\alpha(\text{P})=0.000643$ 10; $\alpha(\text{Q})=5.04\times 10^{-5}$ 8
2575.1	(10 ⁺)	306.7 5		2268.4	(9 ⁺)	(M1)	0.667	$\alpha(\text{K})=0.537$ 8; $\alpha(\text{L})=0.0985$ 15; $\alpha(\text{M})=0.0235$ 4 $\alpha(\text{N})=0.00620$ 10; $\alpha(\text{O})=0.001415$ 21; $\alpha(\text{P})=0.000247$ 4; $\alpha(\text{Q})=1.93\times 10^{-5}$ 3
		524.2 7		2050.9	8 ⁺	(E2)	0.0346	$\alpha(\text{K})=0.0230$ 4; $\alpha(\text{L})=0.00865$ 13; $\alpha(\text{M})=0.00221$ 4 $\alpha(\text{N})=0.000584$ 9; $\alpha(\text{O})=0.0001286$ 19; $\alpha(\text{P})=2.06\times 10^{-5}$ 3; $\alpha(\text{Q})=8.38\times 10^{-7}$ 12
3093.4	(12 ⁺)	518.2 5	100	2575.1	(10 ⁺)	(E2)	0.0356	$\alpha(\text{K})=0.0235$ 4; $\alpha(\text{L})=0.00897$ 13; $\alpha(\text{M})=0.00230$ 4 $\alpha(\text{N})=0.000606$ 9; $\alpha(\text{O})=0.0001333$ 19; $\alpha(\text{P})=2.13\times 10^{-5}$ 3; $\alpha(\text{Q})=8.58\times 10^{-7}$ 13

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Adopted Levels, Gammas (continued)

$\gamma(^{210}\text{Ra})$ (continued)								Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\alpha^\#$	
3263.0	(12 ⁺)	169.5 7	10.9 16	3093.4	(12 ⁺)	(M1)	3.49 7	$\alpha(\text{K})=2.80$ 6; $\alpha(\text{L})=0.519$ 10; $\alpha(\text{M})=0.1241$ 23 $\alpha(\text{N})=0.0327$ 6; $\alpha(\text{O})=0.00747$ 14; $\alpha(\text{P})=0.001301$ 24; $\alpha(\text{Q})=0.0001020$ 19
		687.9 5	100 5	2575.1	(10 ⁺)	(E2)	0.0190	$\alpha(\text{K})=0.01375$ 20; $\alpha(\text{L})=0.00394$ 6; $\alpha(\text{M})=0.000988$ 14 $\alpha(\text{N})=0.000260$ 4; $\alpha(\text{O})=5.78 \times 10^{-5}$ 9; $\alpha(\text{P})=9.47 \times 10^{-6}$ 14; $\alpha(\text{Q})=4.85 \times 10^{-7}$ 7
3898.5	(14 ⁺)	635.5 5	100	3263.0	(12 ⁺)	(E2)	0.0225	$\alpha(\text{K})=0.01595$ 23; $\alpha(\text{L})=0.00491$ 7; $\alpha(\text{M})=0.001237$ 18 $\alpha(\text{N})=0.000326$ 5; $\alpha(\text{O})=7.23 \times 10^{-5}$ 11; $\alpha(\text{P})=1.176 \times 10^{-5}$ 17; $\alpha(\text{Q})=5.67 \times 10^{-7}$ 8
4257.0	(16 ⁺)	358.5 5	100	3898.5	(14 ⁺)	(E2)	0.0908	$\alpha(\text{K})=0.0491$ 7; $\alpha(\text{L})=0.0309$ 5; $\alpha(\text{M})=0.00812$ 13 $\alpha(\text{N})=0.00214$ 4; $\alpha(\text{O})=0.000466$ 7; $\alpha(\text{P})=7.19 \times 10^{-5}$ 11; $\alpha(\text{Q})=1.89 \times 10^{-6}$ 3

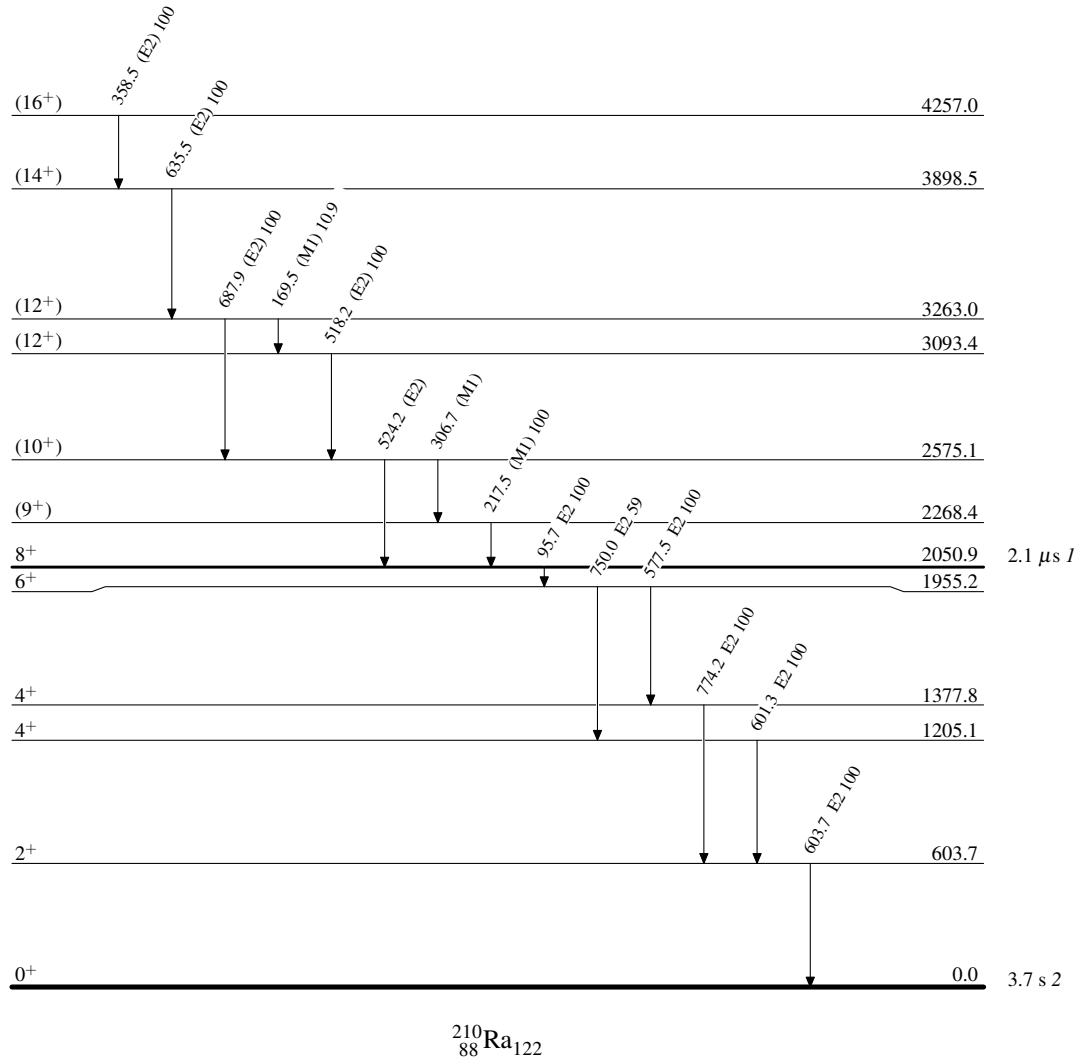
[†] From ($^{30}\text{Si}, 4n\gamma$), except otherwise noted.

[‡] From [2004Re04](#) ($^{30}\text{Si}, 4n\gamma$), suggested based on γ -ray intensities between two rings of the clover array. Quadrupole transitions favored in the backward ring (140°) and dipole transitions in the side rings (90°).

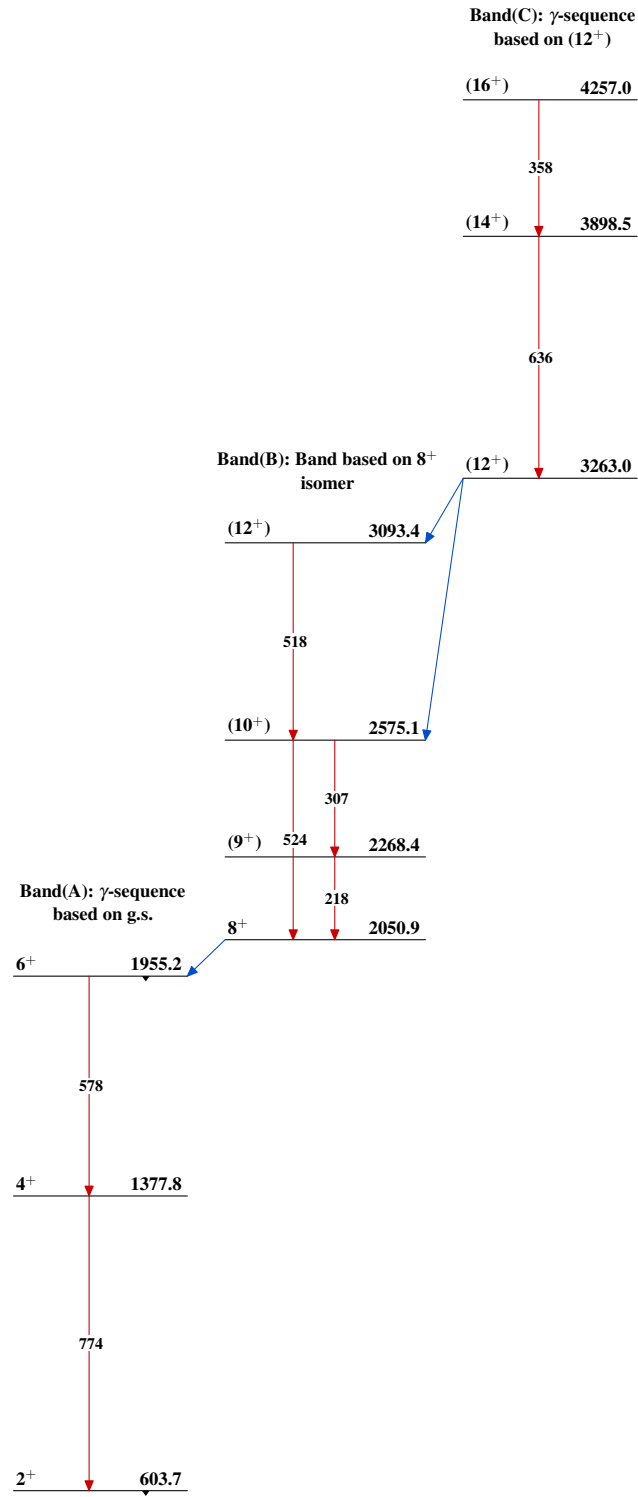
[#] [Additional information 1](#).

Adopted Levels, Gammas**Level Scheme**

Intensities: Relative photon branching from each level



Adopted Levels, Gammas



$^{210}_{88}\text{Ra}_{122}$