

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 112,1115 (2011)	31-Oct-2010

$Q(\beta^-) = -3474$ 11; $S(n) = 7195$ 12; $S(p) = 5637$ 11; $Q(\alpha) = 7592$ 6 [2012Wa38](#)

Note: Current evaluation has used the following Q record -3471 11 7193 12 5635 12 7592 6 [2009AuZZ](#), [2003Au03](#).
[Additional information 1.](#)

Calculations, compilations, systematics:

^{14}C decay rate: [1986De32](#).

Spontaneous emission of heavy ions: [1986Po06](#).

α decay Γ : [1995De59](#), [1992De44](#).

Binding energy, deformation role: [1986Ch23](#).

Cluster model for α decay, Geiger-Nuttall plot: [1991Bu05](#), [1986Ir01](#).

Equilibrium deformation: [1995Ru10](#), [1994Cw01](#), [1991Sk01](#), [1989Eg02](#), [1988So08](#), [1984Na22](#).

$K^\pi = 0^+$ and $K^\pi = 0^-$ bands: [1980Sh07](#).

Levels, $\beta(\lambda)$ ratios: [1995De13](#), [1995Mi22](#), [1993Am07](#), [1993Dz01](#), [1991Eg01](#), [1987En05](#), [1986Da03](#), [1986Le05](#).

Octupole shapes and shape changes: [1987Na10](#).

p-n interaction energy: [1990Mo11](#).

Super- and hyperdeformed configurations: [1995We02](#).

Quasi-bands in even-even nuclei: [1984Sa37](#).

Yrast band parity splitting: [1995Jo11](#), [1993Sc11](#).

Fission: [1999Po19](#), [1997An08](#).

 ^{220}Ra LevelsCross Reference (XREF) Flags

- A** ^{220}Fr β^- decay
B ^{224}Th α decay
C ^{208}Pb (^{14}C , $2n\gamma$)
D ^{208}Pb (^{18}O , $\alpha 2n\gamma$)

E(level) [†]	J^π [‡]	$T_{1/2}$	XREF	Comments
0 [#]	0 ⁺	18 ms 2	ABCD	% α =100 $T_{1/2}$: weighted average of 17 ms 2 (1990An19) and 23 ms 5 (1961Ru06); other: 31 ms 8 (1978IbZZ). Isotope shift: $\Delta\langle r^2 \rangle = +0.68$ 7 relative to ^{214}Ra (1988Ah02).
178.47 [#] 12	2 ⁺		ABCD	J^π : E2 γ ray to 0 ⁺ . $T_{1/2}$: from 2Z-N=44 systematics 1992Ro02 predict $T_{1/2}$ =670 ps.
410.07 [#] 23	4 ⁺		CD	J^π : stretched E2 γ ray to 2 ⁺ .
412.98 [@] 10	(1 ⁻)		ABC	J^π : γ rays to 0 ⁺ , 2 ⁺ . Probable bandhead of $K^\pi=0^-$ band.
474.17 [@] 23	(3 ⁻)		BC	J^π : γ ray to 2 ⁺ . Probable member of $K^\pi=0^-$ band.
634.8 [@] 4	(5 ⁻)		CD	J^π : E1 γ ray to 4 ⁺ .
688.1 [#] 3	6 ⁺		CD	J^π : E2 γ ray to 4 ⁺ .
873.0 [@] 4	(7 ⁻)		CD	J^π : E1 γ ray to 6 ⁺ .
1001.2 [#] 4	8 ⁺		CD	J^π : E1 γ ray to 7 ⁻ ; E2 γ ray to 6 ⁺ .
1163.8 [@] 4	(9 ⁻)		CD	J^π : E1 γ ray to 8 ⁺ .
1342.7 [#] 5	10 ⁺		CD	
1496.1 [@] 5	(11 ⁻)		CD	J^π : E1 γ ray to 10 ⁺ .

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Adopted Levels, Gammas (continued) ^{220}Ra Levels (continued)

E(level) [†]	J^π [‡]	XREF	Comments
1711.2 [#] 5	12 ⁺	CD	J^π : E1 γ ray to (11) ⁻ .
1863.7 [@] 5	(13) ⁻	CD	J^π : E1 γ ray to 12 ⁺ .
2105.7 [#] 5	14 ⁺	CD	
2262.5 [@] 5	(15) ⁻	CD	J^π : E1 γ ray to 14 ⁺ .
2523.5 [#] 6	16 ⁺	CD	
2690.1 [@] 6	(17) ⁻	CD	J^π : E1 γ ray to 16 ⁺ .
2961.9 [#] 6	18 ⁺	CD	
3144.5 [@] 6	(19) ⁻	CD	
3417.6 [#] 6	(20) ⁺	D	
3624.0 [@] 6	(21) ⁻	CD	
3888.6 [#] 7	(22) ⁺	D	
4122.7 [@] 7	(23) ⁻	D	
4374.7 [#] 7	(24) ⁺	D	
4636.3 [@] 7	(25) ⁻	D	
4873.6 [#] 7	(26) ⁺	D	
5164.1 [@] 8	(27) ⁻	D	
5384.5 [#] 8	(28) ⁺	D	
5703.0 [@] 9	(29) ⁻	D	
5912.0 [#] 9	(30) ⁺	D	
6255.5 [?] 10	(31) ⁻	D	

[†] Deduced by evaluators from a least-squares fit to γ -ray energies.

[‡] From bands structure in ($^{14}\text{C}, 2n\gamma$) and ($^{18}\text{O}, \alpha 2n\gamma$). The assignments up to $J^\pi=24^+$ have been confirmed by stretched Q and stretched D γ -ray transitions from $\gamma(\theta)$ experiments in ($^{18}\text{O}, \alpha 2n\gamma$). In addition, arguments based on γ -ray multiplicities are given here.

Band(A): $K^\pi=0^+$ g.s. rotational band.

@ Band(B): $K^\pi=0^-$ band.

 $\gamma(^{220}\text{Ra})$

$E_i(\text{level})$	J^π_i	E_γ [‡]	I_γ [‡]	E_f	J^π_f	Mult. [#]	$\alpha^\dagger$	Comments
178.47	2 ⁺	178.4 [@] 2		0	0 ⁺	E2	0.892	$\alpha(\text{K})=0.200$ 3; $\alpha(\text{L})=0.509$ 8; $\alpha(\text{M})=0.1379$ 21; $\alpha(\text{N}+..)=0.0454$ 7 $\alpha(\text{N})=0.0364$ 6; $\alpha(\text{O})=0.00779$ 12; $\alpha(\text{P})=0.001149$ 17; $\alpha(\text{Q})=9.99\times 10^{-6}$ 15
410.07	4 ⁺	231.6 2		178.47	2 ⁺	E2	0.350	$\alpha(\text{K})=0.1209$ 17; $\alpha(\text{L})=0.1684$ 25; $\alpha(\text{M})=0.0452$ 7; $\alpha(\text{N}+..)=0.01491$ 22 $\alpha(\text{N})=0.01195$ 18; $\alpha(\text{O})=0.00257$ 4; $\alpha(\text{P})=0.000384$ 6; $\alpha(\text{Q})=5.19\times 10^{-6}$ 8
412.98	(1) ⁻	234.5 [@] 1 413.0 [@] 1	72 [@] 20 100 [@] 13	178.47	2 ⁺ 0 0 ⁺			
474.17	(3) ⁻	295.7 ^{&} 2		178.47	2 ⁺			
634.8	(5) ⁻	224.6 3		410.07	4 ⁺	E1	0.0685	$\alpha(\text{K})=0.0548$ 8; $\alpha(\text{L})=0.01042$ 15; $\alpha(\text{M})=0.00249$ 4; $\alpha(\text{N}+..)=0.000821$ 12 $\alpha(\text{N})=0.000651$ 10; $\alpha(\text{O})=0.0001447$ 21; $\alpha(\text{P})=2.38\times 10^{-5}$ 4; $\alpha(\text{Q})=1.456\times 10^{-6}$ 21

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Adopted Levels, Gammas (continued)

$\gamma(^{220}\text{Ra})$ (continued)								Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	$\alpha^\dagger$	
688.1	6 ⁺	278.1 2		410.07	4 ⁺	E2	0.192	$\alpha(\text{K})=0.0830$ 12; $\alpha(\text{L})=0.0806$ 12; $\alpha(\text{M})=0.0215$ 3; $\alpha(\text{N}+..)=0.00709$ 11 $\alpha(\text{N})=0.00568$ 9; $\alpha(\text{O})=0.001224$ 18; $\alpha(\text{P})=0.000185$ 3; $\alpha(\text{Q})=3.36\times 10^{-6}$ 5
873.0	(7) ⁻	184.9 2	100 10	688.1	6 ⁺	E1	0.1088	$\alpha(\text{K})=0.0865$ 13; $\alpha(\text{L})=0.01695$ 25; $\alpha(\text{M})=0.00406$ 6; $\alpha(\text{N}+..)=0.001335$ 19 $\alpha(\text{N})=0.001059$ 16; $\alpha(\text{O})=0.000235$ 4; $\alpha(\text{P})=3.83\times 10^{-5}$ 6; $\alpha(\text{Q})=2.24\times 10^{-6}$ 4
		237.9 4	8 2	634.8	(5) ⁻	(E2) ^a	0.319	$\alpha(\text{K})=0.1145$ 17; $\alpha(\text{L})=0.1508$ 24; $\alpha(\text{M})=0.0405$ 7; $\alpha(\text{N}+..)=0.01334$ 21 $\alpha(\text{N})=0.01069$ 17; $\alpha(\text{O})=0.00230$ 4; $\alpha(\text{P})=0.000344$ 6; $\alpha(\text{Q})=4.86\times 10^{-6}$ 7
1001.2	8 ⁺	128.1 3	100 10	873.0	(7) ⁻	E1	0.264	$\alpha(\text{K})=0.206$ 4; $\alpha(\text{L})=0.0436$ 7; $\alpha(\text{M})=0.01049$ 16; $\alpha(\text{N}+..)=0.00343$ 6 $\alpha(\text{N})=0.00273$ 5; $\alpha(\text{O})=0.000599$ 10; $\alpha(\text{P})=9.55\times 10^{-5}$ 15; $\alpha(\text{Q})=5.10\times 10^{-6}$ 8
		313.3 3	57 11	688.1	6 ⁺	E2	0.1336	$\alpha(\text{K})=0.0648$ 10; $\alpha(\text{L})=0.0509$ 8; $\alpha(\text{M})=0.01348$ 20; $\alpha(\text{N}+..)=0.00445$ 7 $\alpha(\text{N})=0.00356$ 6; $\alpha(\text{O})=0.000770$ 12; $\alpha(\text{P})=0.0001177$ 17; $\alpha(\text{Q})=2.55\times 10^{-6}$ 4
1163.8	(9) ⁻	162.5 2	100 10	1001.2	8 ⁺	E1	0.1485	$\alpha(\text{K})=0.1174$ 17; $\alpha(\text{L})=0.0236$ 4; $\alpha(\text{M})=0.00565$ 9; $\alpha(\text{N}+..)=0.00185$ 3 $\alpha(\text{N})=0.001473$ 22; $\alpha(\text{O})=0.000325$ 5; $\alpha(\text{P})=5.27\times 10^{-5}$ 8; $\alpha(\text{Q})=2.99\times 10^{-6}$ 5
		290.8 4	13 4	873.0	(7) ⁻	(E2) ^a	0.1673	$\alpha(\text{K})=0.0756$ 11; $\alpha(\text{L})=0.0677$ 11; $\alpha(\text{M})=0.0180$ 3; $\alpha(\text{N}+..)=0.00594$ 9 $\alpha(\text{N})=0.00476$ 8; $\alpha(\text{O})=0.001027$ 16; $\alpha(\text{P})=0.0001560$ 24; $\alpha(\text{Q})=3.03\times 10^{-6}$ 5
1342.7	10 ⁺	178.6 3	100 20	1163.8	(9) ⁻	(E1) ^a	0.1183	$\alpha(\text{K})=0.0939$ 14; $\alpha(\text{L})=0.0185$ 3; $\alpha(\text{M})=0.00443$ 7; $\alpha(\text{N}+..)=0.001457$ 22 $\alpha(\text{N})=0.001157$ 17; $\alpha(\text{O})=0.000256$ 4; $\alpha(\text{P})=4.17\times 10^{-5}$ 6; $\alpha(\text{Q})=2.42\times 10^{-6}$ 4
		341.5 3	33 7	1001.2	8 ⁺	(E2) ^a	0.1040	$\alpha(\text{K})=0.0542$ 8; $\alpha(\text{L})=0.0369$ 6; $\alpha(\text{M})=0.00972$ 14; $\alpha(\text{N}+..)=0.00321$ 5 $\alpha(\text{N})=0.00257$ 4; $\alpha(\text{O})=0.000557$ 8; $\alpha(\text{P})=8.57\times 10^{-5}$ 13; $\alpha(\text{Q})=2.10\times 10^{-6}$ 3
1496.1	(11) ⁻	153.6 3	100 20	1342.7	10 ⁺	E1	0.170	$\alpha(\text{K})=0.1342$ 20; $\alpha(\text{L})=0.0272$ 4; $\alpha(\text{M})=0.00653$ 10; $\alpha(\text{N}+..)=0.00214$ 4 $\alpha(\text{N})=0.00170$ 3; $\alpha(\text{O})=0.000376$ 6; $\alpha(\text{P})=6.06\times 10^{-5}$ 9; $\alpha(\text{Q})=3.39\times 10^{-6}$ 5
		332.7 3	40 8	1163.8	(9) ⁻	(E2) ^a	0.1121	$\alpha(\text{K})=0.0572$ 8; $\alpha(\text{L})=0.0406$ 6; $\alpha(\text{M})=0.01072$ 16; $\alpha(\text{N}+..)=0.00354$ 6 $\alpha(\text{N})=0.00283$ 4; $\alpha(\text{O})=0.000614$ 9; $\alpha(\text{P})=9.42\times 10^{-5}$ 14; $\alpha(\text{Q})=2.23\times 10^{-6}$ 4
1711.2	12 ⁺	215.1 3	100 20	1496.1	(11) ⁻	E1	0.0759	$\alpha(\text{K})=0.0606$ 9; $\alpha(\text{L})=0.01160$ 17; $\alpha(\text{M})=0.00277$ 4; $\alpha(\text{N}+..)=0.000913$ 14 $\alpha(\text{N})=0.000724$ 11; $\alpha(\text{O})=0.0001610$ 24; $\alpha(\text{P})=2.65\times 10^{-5}$ 4; $\alpha(\text{Q})=1.601\times 10^{-6}$ 23
		368.2 3	44 9	1342.7	10 ⁺	(E2) ^a	0.0843	$\alpha(\text{K})=0.0465$ 7; $\alpha(\text{L})=0.0281$ 4; $\alpha(\text{M})=0.00737$ 11; $\alpha(\text{N}+..)=0.00244$ 4 $\alpha(\text{N})=0.00195$ 3; $\alpha(\text{O})=0.000423$ 6; $\alpha(\text{P})=6.55\times 10^{-5}$ 10; $\alpha(\text{Q})=1.78\times 10^{-6}$ 3
1863.7	(13) ⁻	152.4 3	100 20	1711.2	12 ⁺	E1	0.173	$\alpha(\text{K})=0.1368$ 21; $\alpha(\text{L})=0.0278$ 5; $\alpha(\text{M})=0.00667$ 10; $\alpha(\text{N}+..)=0.00219$ 4

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Adopted Levels, Gammas (continued)

$\gamma(^{220}\text{Ra})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult. [#]	$\alpha^\ddagger$	Comments
1863.7	(13) ⁻	367.6 3	78 16	1496.1	(11) ⁻	(E2) ^a	0.0847	$\alpha(\text{N})=0.00174$ 3; $\alpha(\text{O})=0.000383$ 6; $\alpha(\text{P})=6.18\times 10^{-5}$ 10; $\alpha(\text{Q})=3.45\times 10^{-6}$ 5 $\alpha(\text{K})=0.0466$ 7; $\alpha(\text{L})=0.0282$ 4; $\alpha(\text{M})=0.00741$ 11; $\alpha(\text{N}+..)=0.00245$ 4
2105.7	14 ⁺	241.9 3	100 20	1863.7	(13) ⁻	(E1) ^a	0.0576	$\alpha(\text{N})=0.00196$ 3; $\alpha(\text{O})=0.000425$ 6; $\alpha(\text{P})=6.58\times 10^{-5}$ 10; $\alpha(\text{Q})=1.79\times 10^{-6}$ 3 $\alpha(\text{K})=0.0462$ 7; $\alpha(\text{L})=0.00868$ 13; $\alpha(\text{M})=0.00207$ 3; $\alpha(\text{N}+..)=0.000684$ 10
		394.4 3	40 8	1711.2	12 ⁺	(E2) ^a	0.0701	$\alpha(\text{N})=0.000542$ 8; $\alpha(\text{O})=0.0001207$ 18; $\alpha(\text{P})=2.00\times 10^{-5}$ 3; $\alpha(\text{Q})=1.238\times 10^{-6}$ 18 $\alpha(\text{K})=0.0404$ 6; $\alpha(\text{L})=0.0220$ 4; $\alpha(\text{M})=0.00575$ 9; $\alpha(\text{N}+..)=0.00190$ 3
2262.5	(15) ⁻	156.7 3	72 14	2105.7	14 ⁺	E1	0.1621	$\alpha(\text{N})=0.001519$ 22; $\alpha(\text{O})=0.000331$ 5; $\alpha(\text{P})=5.15\times 10^{-5}$ 8; $\alpha(\text{Q})=1.530\times 10^{-6}$ 22 $\alpha(\text{K})=0.1280$ 19; $\alpha(\text{L})=0.0259$ 4; $\alpha(\text{M})=0.00620$ 10; $\alpha(\text{N}+..)=0.00204$ 3
		399.1 3	100 20	1863.7	(13) ⁻	(E2) ^a	0.0679	$\alpha(\text{N})=0.001618$ 24; $\alpha(\text{O})=0.000357$ 6; $\alpha(\text{P})=5.76\times 10^{-5}$ 9; $\alpha(\text{Q})=3.24\times 10^{-6}$ 5 $\alpha(\text{K})=0.0394$ 6; $\alpha(\text{L})=0.0211$ 3; $\alpha(\text{M})=0.00552$ 8; $\alpha(\text{N}+..)=0.00183$ 3
2523.5	16 ⁺	261.1 3	100 20	2262.5	(15) ⁻	(E1) ^a	0.0483	$\alpha(\text{N})=0.001457$ 21; $\alpha(\text{O})=0.000317$ 5; $\alpha(\text{P})=4.95\times 10^{-5}$ 7; $\alpha(\text{Q})=1.492\times 10^{-6}$ 21 $\alpha(\text{K})=0.0388$ 6; $\alpha(\text{L})=0.00721$ 11; $\alpha(\text{M})=0.001721$ 25; $\alpha(\text{N}+..)=0.000568$ 9
		417.6 3	37 7	2105.7	14 ⁺	(E2) ^a	0.0604	$\alpha(\text{N})=0.000450$ 7; $\alpha(\text{O})=0.0001004$ 15; $\alpha(\text{P})=1.665\times 10^{-5}$ 24; $\alpha(\text{Q})=1.049\times 10^{-6}$ 15 $\alpha(\text{K})=0.0360$ 5; $\alpha(\text{L})=0.0181$ 3; $\alpha(\text{M})=0.00471$ 7; $\alpha(\text{N}+..)=0.001558$ 23
2690.1	(17) ⁻	166.6 3	78 16	2523.5	16 ⁺	E1	0.1398	$\alpha(\text{N})=0.001243$ 18; $\alpha(\text{O})=0.000271$ 4; $\alpha(\text{P})=4.25\times 10^{-5}$ 6; $\alpha(\text{Q})=1.352\times 10^{-6}$ 19 $\alpha(\text{K})=0.1107$ 17; $\alpha(\text{L})=0.0221$ 4; $\alpha(\text{M})=0.00530$ 8; $\alpha(\text{N}+..)=0.00174$ 3
		427.6 3	100 20	2262.5	(15) ⁻	(E2) ^a	0.0568	$\alpha(\text{N})=0.001382$ 21; $\alpha(\text{O})=0.000305$ 5; $\alpha(\text{P})=4.95\times 10^{-5}$ 8; $\alpha(\text{Q})=2.83\times 10^{-6}$ 5 $\alpha(\text{K})=0.0343$ 5; $\alpha(\text{L})=0.01669$ 24; $\alpha(\text{M})=0.00434$ 7; $\alpha(\text{N}+..)=0.001436$ 21
2961.9	18 ⁺	271.6 3	100 20	2690.1	(17) ⁻	(E1) ^a	0.0441	$\alpha(\text{N})=0.001145$ 17; $\alpha(\text{O})=0.000250$ 4; $\alpha(\text{P})=3.92\times 10^{-5}$ 6; $\alpha(\text{Q})=1.286\times 10^{-6}$ 19 $\alpha(\text{K})=0.0354$ 5; $\alpha(\text{L})=0.00656$ 10; $\alpha(\text{M})=0.001564$ 23; $\alpha(\text{N}+..)=0.000517$ 8
		438.4 3	92 18	2523.5	16 ⁺	(E2) ^a	0.0533	$\alpha(\text{N})=0.000409$ 6; $\alpha(\text{O})=9.13\times 10^{-5}$ 13; $\alpha(\text{P})=1.517\times 10^{-5}$ 22; $\alpha(\text{Q})=9.64\times 10^{-7}$ 14 $\alpha(\text{K})=0.0327$ 5; $\alpha(\text{L})=0.01535$ 22; $\alpha(\text{M})=0.00398$ 6; $\alpha(\text{N}+..)=0.001318$ 19
3144.5	(19) ⁻	182.4 3	88 18	2961.9	18 ⁺	(E1) ^a	0.1124	$\alpha(\text{N})=0.001051$ 15; $\alpha(\text{O})=0.000230$ 4; $\alpha(\text{P})=3.61\times 10^{-5}$ 6; $\alpha(\text{Q})=1.219\times 10^{-6}$ 18 $\alpha(\text{K})=0.0893$ 13; $\alpha(\text{L})=0.0175$ 3; $\alpha(\text{M})=0.00420$ 7; $\alpha(\text{N}+..)=0.001381$ 21
		454.6 3	100 20	2690.1	(17) ⁻	(E2) ^a	0.0487	$\alpha(\text{N})=0.001097$ 16; $\alpha(\text{O})=0.000243$ 4; $\alpha(\text{P})=3.96\times 10^{-5}$ 6; $\alpha(\text{Q})=2.31\times 10^{-6}$ 4 $\alpha(\text{K})=0.0304$ 5; $\alpha(\text{L})=0.01362$ 20; $\alpha(\text{M})=0.00352$ 5; $\alpha(\text{N}+..)=0.001167$ 17
								$\alpha(\text{N})=0.000930$ 14; $\alpha(\text{O})=0.000204$ 3; $\alpha(\text{P})=3.21\times 10^{-5}$ 5; $\alpha(\text{Q})=1.128\times 10^{-6}$ 16

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Adopted Levels, Gammas (continued)

$\gamma(^{220}\text{Ra})$ (continued)								Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	$\alpha^\dagger$	
3417.6	(20 ⁺)	273.2 3	100 20	3144.5	(19 ⁻)	(E1) ^a	0.0435	$\alpha(\text{K})=0.0350$ 5; $\alpha(\text{L})=0.00647$ 10; $\alpha(\text{M})=0.001542$ 22; $\alpha(\text{N}+..)=0.000509$ 8 $\alpha(\text{N})=0.000403$ 6; $\alpha(\text{O})=9.01\times 10^{-5}$ 13; $\alpha(\text{P})=1.497\times 10^{-5}$ 22; $\alpha(\text{Q})=9.52\times 10^{-7}$ 14
		455.8 3	46 9	2961.9	18 ⁺	(E2) ^a	0.0484	$\alpha(\text{K})=0.0302$ 5; $\alpha(\text{L})=0.01350$ 20; $\alpha(\text{M})=0.00349$ 5; $\alpha(\text{N}+..)=0.001156$ 17 $\alpha(\text{N})=0.000922$ 13; $\alpha(\text{O})=0.000202$ 3; $\alpha(\text{P})=3.18\times 10^{-5}$ 5; $\alpha(\text{Q})=1.122\times 10^{-6}$ 16
3624.0	(21 ⁻)	206.4 3	100 20	3417.6	(20 ⁺)	(E1) ^a	0.0837	$\alpha(\text{K})=0.0668$ 10; $\alpha(\text{L})=0.01285$ 19; $\alpha(\text{M})=0.00307$ 5; $\alpha(\text{N}+..)=0.001012$ 15 $\alpha(\text{N})=0.000803$ 12; $\alpha(\text{O})=0.000178$ 3; $\alpha(\text{P})=2.92\times 10^{-5}$ 5; $\alpha(\text{Q})=1.75\times 10^{-6}$ 3
		479.4 3	90 18	3144.5	(19 ⁻)	(E2) ^a	0.0428	$\alpha(\text{K})=0.0274$ 4; $\alpha(\text{L})=0.01146$ 17; $\alpha(\text{M})=0.00295$ 5; $\alpha(\text{N}+..)=0.000978$ 14 $\alpha(\text{N})=0.000779$ 11; $\alpha(\text{O})=0.0001709$ 25; $\alpha(\text{P})=2.71\times 10^{-5}$ 4; $\alpha(\text{Q})=1.009\times 10^{-6}$ 15
3888.6	(22 ⁺)	264.4 3	100 20	3624.0	(21 ⁻)	(E1) ^a	0.0469	$\alpha(\text{K})=0.0377$ 6; $\alpha(\text{L})=0.00700$ 10; $\alpha(\text{M})=0.001669$ 24; $\alpha(\text{N}+..)=0.000551$ 8 $\alpha(\text{N})=0.000436$ 7; $\alpha(\text{O})=9.74\times 10^{-5}$ 14; $\alpha(\text{P})=1.616\times 10^{-5}$ 23; $\alpha(\text{Q})=1.021\times 10^{-6}$ 15
		471.0 3	67 13	3417.6	(20 ⁺)	(E2) ^a	0.0446	$\alpha(\text{K})=0.0284$ 4; $\alpha(\text{L})=0.01213$ 18; $\alpha(\text{M})=0.00313$ 5; $\alpha(\text{N}+..)=0.001037$ 15 $\alpha(\text{N})=0.000826$ 12; $\alpha(\text{O})=0.000181$ 3; $\alpha(\text{P})=2.87\times 10^{-5}$ 4; $\alpha(\text{Q})=1.047\times 10^{-6}$ 15
4122.7	(23 ⁻)	233.8 3	100 20	3888.6	(22 ⁺)	(E1) ^a	0.0624	$\alpha(\text{K})=0.0500$ 8; $\alpha(\text{L})=0.00944$ 14; $\alpha(\text{M})=0.00225$ 4; $\alpha(\text{N}+..)=0.000743$ 11 $\alpha(\text{N})=0.000589$ 9; $\alpha(\text{O})=0.0001312$ 19; $\alpha(\text{P})=2.16\times 10^{-5}$ 4; $\alpha(\text{Q})=1.334\times 10^{-6}$ 19
		498.9 4	63 19	3624.0	(21 ⁻)	(E2) ^a	0.0389	$\alpha(\text{K})=0.0253$ 4; $\alpha(\text{L})=0.01010$ 15; $\alpha(\text{M})=0.00259$ 4; $\alpha(\text{N}+..)=0.000860$ 13 $\alpha(\text{N})=0.000684$ 10; $\alpha(\text{O})=0.0001503$ 22; $\alpha(\text{P})=2.39\times 10^{-5}$ 4; $\alpha(\text{Q})=9.28\times 10^{-7}$ 13
4374.7	(24 ⁺)	252.0 3	100 20	4122.7	(23 ⁻)	(E1) ^a	0.0524	$\alpha(\text{K})=0.0420$ 6; $\alpha(\text{L})=0.00786$ 12; $\alpha(\text{M})=0.00188$ 3; $\alpha(\text{N}+..)=0.000619$ 9 $\alpha(\text{N})=0.000490$ 7; $\alpha(\text{O})=0.0001093$ 16; $\alpha(\text{P})=1.81\times 10^{-5}$ 3; $\alpha(\text{Q})=1.133\times 10^{-6}$ 17
		486.3 3	57 11	3888.6	(22 ⁺)	(E2) ^a	0.0413	$\alpha(\text{K})=0.0266$ 4; $\alpha(\text{L})=0.01095$ 16; $\alpha(\text{M})=0.00282$ 4; $\alpha(\text{N}+..)=0.000934$ 14 $\alpha(\text{N})=0.000744$ 11; $\alpha(\text{O})=0.0001632$ 23; $\alpha(\text{P})=2.59\times 10^{-5}$ 4; $\alpha(\text{Q})=9.79\times 10^{-7}$ 14
4636.3	(25 ⁻)	261.9 4	57 17	4374.7	(24 ⁺)			
		513.6 4	100 30	4122.7	(23 ⁻)			
4873.6	(26 ⁺)	237.6 4	100 30	4636.3	(25 ⁻)			
		498.7 4	67 20	4374.7	(24 ⁺)			
5164.1	(27 ⁻)	290.7 4		4873.6	(26 ⁺)			
		527.7 4		4636.3	(25 ⁻)			
5384.5	(28 ⁺)	220.5 4	71 28	5164.1	(27 ⁻)			
		510.8 4	100 30	4873.6	(26 ⁺)			
5703.0	(29 ⁻)	318.2 ^b 4	25	5384.5	(28 ⁺)			
		538.9 4	100 30	5164.1	(27 ⁻)			
5912.0?	(30 ⁺)	209.7 ^b 4		5703.0	(29 ⁻)			
		527.0 ^b 4		5384.5	(28 ⁺)			
6255.5?	(31 ⁻)	552.5 ^b 4		5703.0	(29 ⁻)			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

 $\gamma(^{220}\text{Ra})$ (continued)

[†] [Additional information 2.](#)

[‡] From ($^{18}\text{O},\alpha 2n\gamma$), unless otherwise noted.

[#] From ($^{14}\text{C},2n\gamma$) and ($^{18}\text{O},\alpha 2n\gamma$).

[@] From ^{220}Fr β^- decay.

[&] From ($^{14}\text{C},2n\gamma$).

^a From $\gamma(\theta)$ ($^{18}\text{O},\alpha 2n\gamma$), assuming stretched Q are E2 and stretched D are E1.

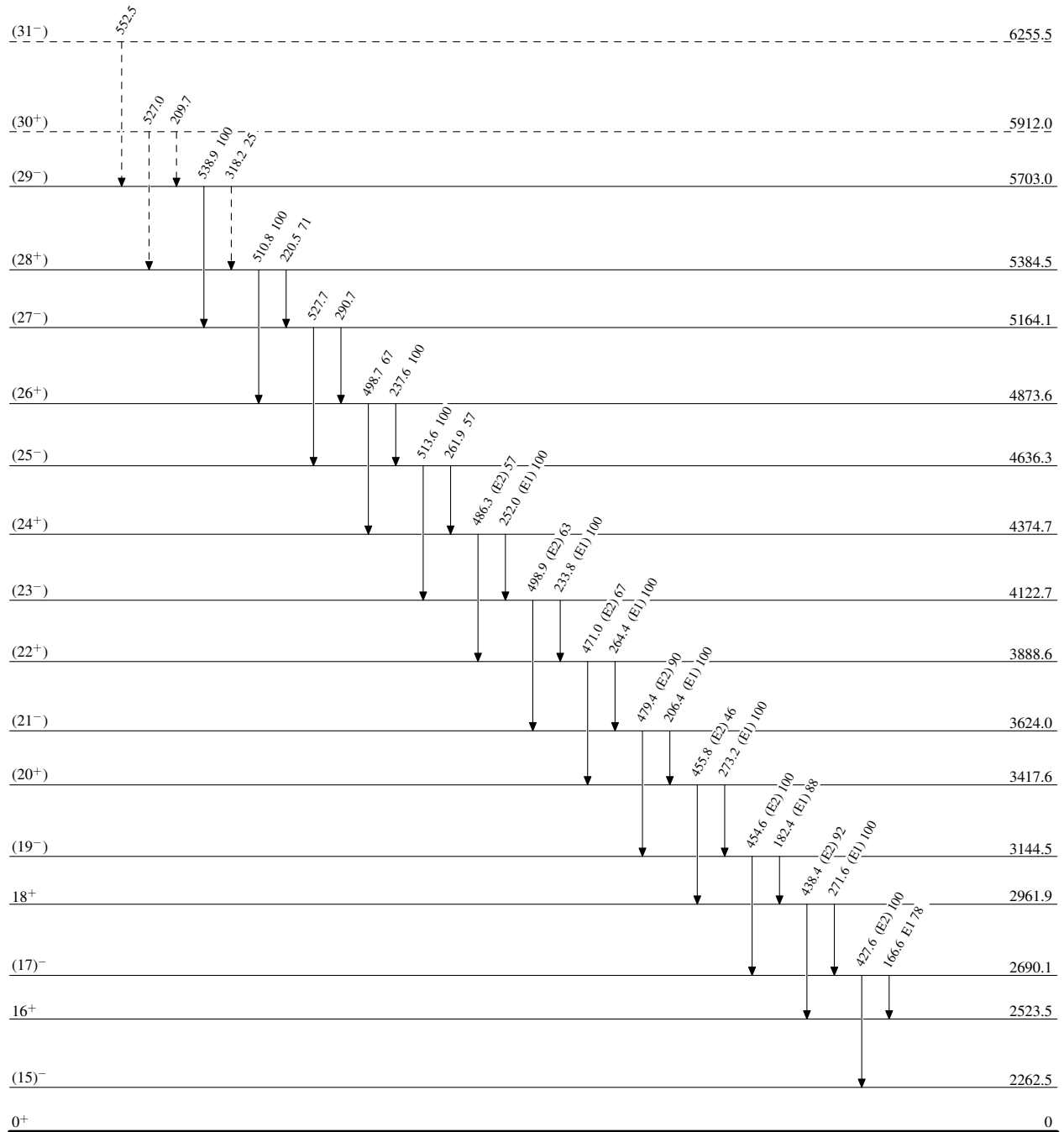
^b Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

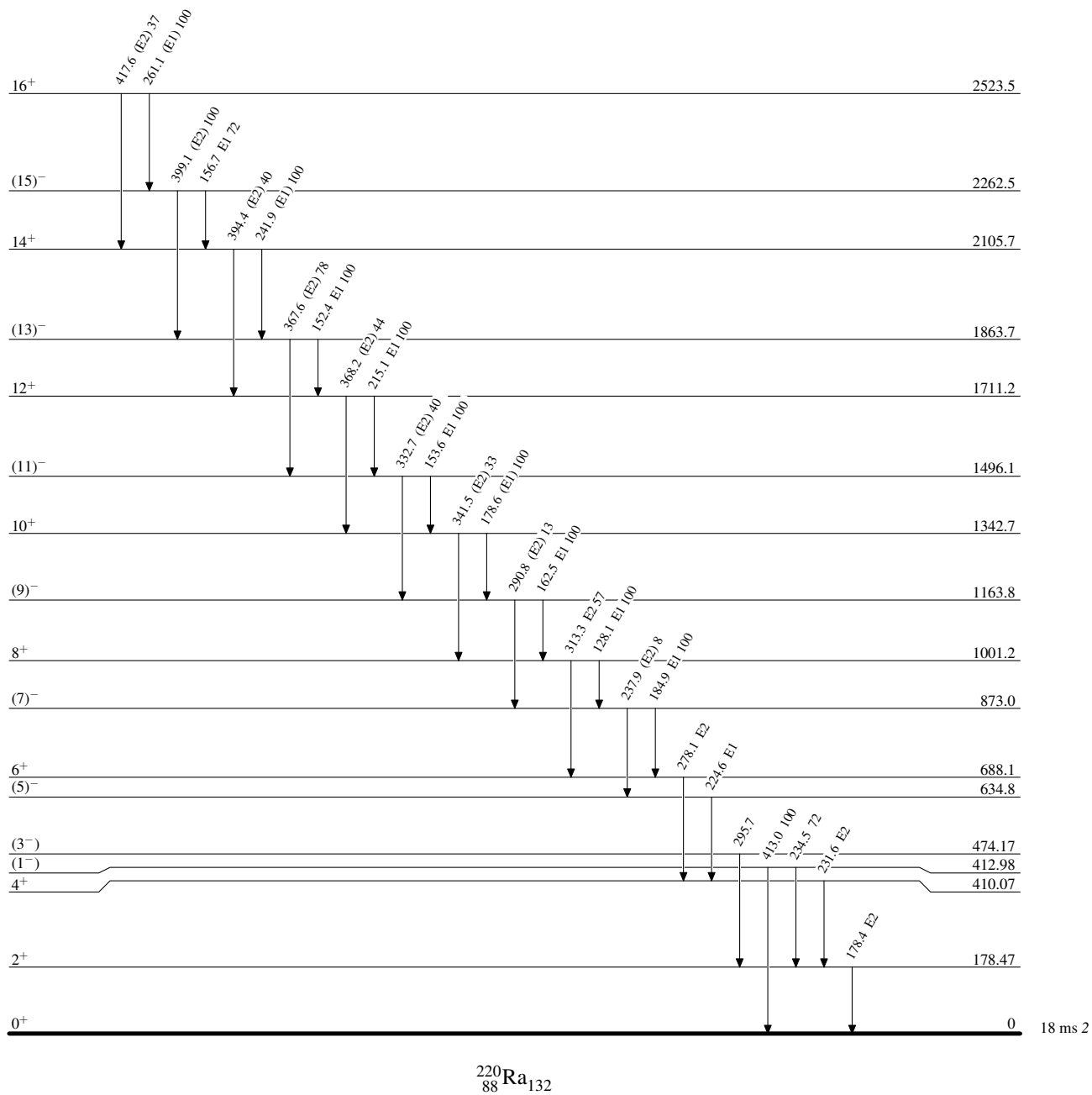
Level Scheme

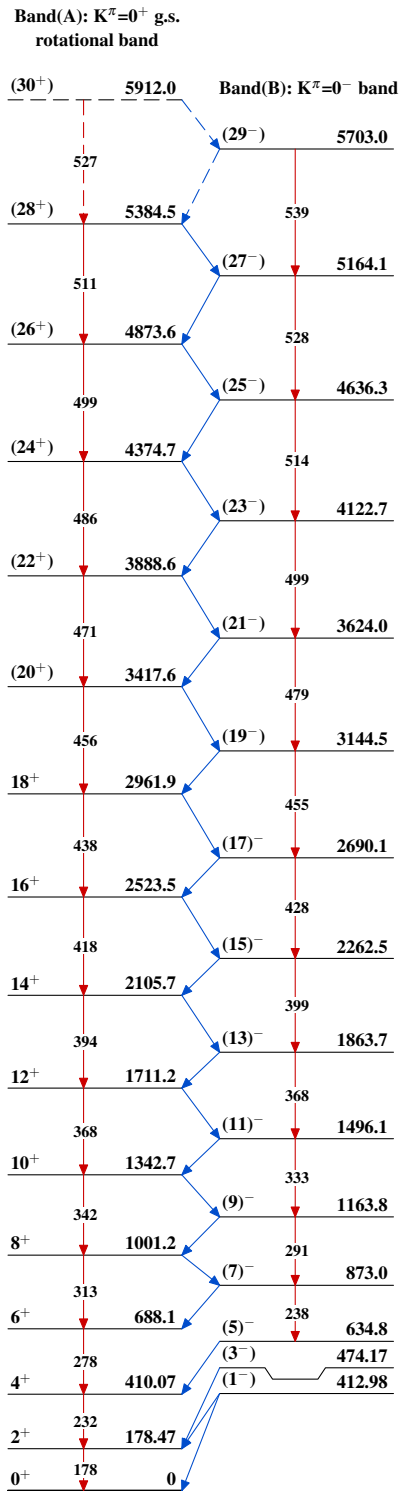
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



Adopted Levels, Gammas $^{220}_{88}\text{Ra}_{132}$