Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 113,715 (2012)	31-May-2011

Q(β^-)=1461.8 *19*; S(n)=5144.80 *9*; S(p)=8871 *6*; Q(α)=883 *3* 2012Wa38
Note: Current evaluation has used the following Q record 1461.9 185144.80 *9* 8872 6 *883.6 28* 2011AuZZ.
n-capture cross sections, resonance integrals: 1997Ka47, 1996Ka03, 1990Xi04.
Calculated n-capture and n-fission cross sections: 2010Pr07.
Calculated levels energies, magnetic and quadrupole moments: 2007Ji14.
Measured U(n,f) and Th(n,f) cross sections (2010Ad13).

^{143}Ce Levels

Cross Reference (XREF) Flags

- A ^{143}La β^- decay
- B ^{142}Ce(n,γ) E=thermal
- C ^{142}Ce(d,p)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	3/2$^-$	33.039 h *6*	ABC	%β^-=100 μ=0.43 *1* (2002Ta01,2011StZZ) J$^\pi$: L=1 in (d,p), atomic beam (1976Fu06). μ: Nuclear Magnetic Resonance on Oriented Nuclei (2002Ta01) Other: 1.0 *3* (1963Ha07). T$_{1/2}$: from 1989Ab18; others: 33.10 h *5* (1989Ku13), 33.0 h *2* (1972Em01). Parent to IAS in ^{143}Pr (1972Le17).
18.9 *1*	7/2$^-$		ABC	Parent to IAS in ^{143}Pr (1972Le17). J$^\pi$: L=3 in (d,p), analyzing power for IAS in (pol p,p′) (1969Gr01).
42.28 *7*	5/2$^-$		ABC	μ=1.0 *3* (1963Ha07,2011StZZ) J$^\pi$: Strong γ rays from levels with J^π=9/2$^-$, 3/2$^-$; observed γ ray to g.s. (J^π=3/2$^-$) must be M1, if E2 it would have not been observed in the γ-ray spectrum because of its much stronger electron internal conversion, and competition with the observed M1 γ ray to a level with J^π=7/2$^-$. μ: Static Nuclear Orientation with γ-ray detection (1963Ha07).
632.5 *5*	(1/2$^-$)		Bc	J$^\pi$: L=(1) in (d,p).
640.3 *2*			A c	J$^\pi$: γ ray to 7/2$^-$ suggests J>1/2.
662.7 *2*	9/2$^-$		A C	J$^\pi$: L=5 in (d,p), γ ray to 5/2$^-$.
808.2 *3*	3/2$^-$		ABc	J$^\pi$: γ ray to 7/2$^-$, L=1 in (d,p), parent to IAS in ^{143}Pr (1972Le17).
817.0 *2*			A c	
862.1 *3*	(1/2)$^-$		BC	J$^\pi$: L=1 in (d,p), parent of (1/2)$^-$ IAS in ^{143}Pr (1972Le17).
1095.3 *2*			A	
1116.8 *3*			A	
1154.1 *3*	3/2$^-$		BC	XREF: C(1162). J$^\pi$: L=1 in (d,p), γ ray to 7/2$^-$.
1165.0 *1*	(>3/2)		AB	J$^\pi$: strongest γ ray is to 7/2$^-$, γ ray to 3/2$^-$, and observed β feeding from 7/2$^+$ suggest J>3/2.
1167.6 *2*	(>3/2)		A	J$^\pi$: strongest γ ray is to 7/2$^-$, γ ray to 3/2$^-$, and observed β feeding from 7/2$^+$ suggest J>3/2.
1172.5 *3*	3/2$^-$,(1/2)$^-$		ABC	J$^\pi$: L=1 in (d,p), Iγ to 3/2$^-$ and 5/2$^-$ are comparable, parent to IAS in ^{143}Pr (1972Le17).
1195 *10*	(5/2)$^-$		C	J$^\pi$: L=3 in (d,p); parent of (5/2)$^-$ IAS in ^{143}Pr (1972Le17).
1220.0 *4*	9/2$^-$		A C	J$^\pi$: L=5 in (d,p), γ ray to 5/2$^-$.
1298 *5*	(5/2)$^-$		C	J$^\pi$: L=3 in (d,p), parent of (5/2)$^-$ IAS in ^{143}Pr (1972Le17).
1506 *10*	5/2$^-$,7/2$^-$		C	J$^\pi$: L=3 in (d,p).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{143}Ce Levels (continued)

E(level)	J^π	XREF	Comments
1542 *10*		C	
1558 *10*	$5/2^-$,$7/2^-$	C	J^π: L=3 in (d,p).
1572.4 *5*	$1/2^-$,$3/2^-$	BC	J^π: L=1 in (d,p).
1598.7 *8*		A	
1620.5 *4*	3/2,$(1/2^-)$†	B	J^π: strong γ ray to $5/2^-$.
1628.7 *4*	3/2,1/2†	B	
1635 *5*	$5/2^-$,$7/2^-$	C	J^π: L=3 in (d,p).
1676.9 *3*		A C	
1714 *10*	$5/2^-$,$7/2^-$	C	J^π: L=3 in (d,p).
1726.7 *2*		A	
1739 *10*	$1/2^-$,$3/2^-$	C	J^π: L=1 in (d,p).
1810 *10*	$5/2^-$,$7/2^-$	C	J^π: L=3 in (d,p).
1835.2 *8*	$(1/2)^-$	B	J^π: γ ray to $3/2^-$, no γ ray to $5/2^+$, L=1 in (d,p).
1857.0 *2*		A C	
1906.1 *5*	$(7/2)^-$	A C	XREF: C(1897). J^π: L=3 in (d,p); no γ ray to $3/2^-$.
1913.4 *11*	$(1/2)^-$	BC	XREF: C(1922). J^π: γ ray to $\leq 3/2^-$, no γ ray to $\geq 5/2^-$; L=1 in (d,p).
1945.4 *6*	$3/2^-$	BC	J^π: L=1 in (d,p), γ ray to $7/2^-$.
1980.2 *1*		A C	
1989.5 *4*		A	
1993.3 *6*	$(3/2)^-$	BC	XREF: C(2006). J^π: L=1 in (d,p); strong γ ray to $5/2^-$.
2027.4 *8*	$(1/2^-)$†	BC	J^π: γ ray to $3/2^-$, no γ ray to $5/2^-$.
2040 *10*		C	
2057.0 *4*		A C	
2061.5 *6*	$3/2^-$†	B	J^π: L=1 in (d,p); γ ray to $7/2^-$.
2065.3 *7*		A C	
2112 *10*		C	
2143 *10*	$1/2^-$,$3/2^-$	C	J^π: L=1 in (d,p).
2160 *10*	$1/2^-$,$3/2^-$	C	J^π: L=1 in (d,p).
2202.0 *6*	1/2,3/2†	B	
2215.9 *6*	$(3/2)^-$†	BC	J^π: L=1 in (d,p); strong γ ray to $5/2^-$.
2232.1 *7*	$(3/2)^-$†	BC	J^π: L=1 in (d,p); strong γ ray to $5/2^-$.
2255 *10*	$1/2^-$,$3/2^-$	C	J^π: L=1 in (d,p).
2255.3 *4*		A	J^π: γ ray to $9/2^-$ exclude J≤3/2.
2272.7? *10*	$1/2^-$,3/2†	B	J^π: strong γ ray to $5/2^-$.
2307.2 *6*	$(5/2^-,7/2^-)$	A	J^π: possible L=3 in (d,p).
2313.9 *8*	$3/2^-$,$1/2^-$	BC	J^π: L=1 in (d,p);
2348 *10*		C	
2403.8 *3*		A C	
2481.3 *5*	$5/2^-$,$7/2^-$	A C	XREF: C(2489). J^π: L=3 in (d,p).
2488.6 *10*	3/2,1/2†	B	
2517.3 *5*	$5/2^-$,$7/2^-$	A C	J^π: L=3 in (d,p).
2519.2 *5*		A	
2537.3 *8*	(3/2,1/2)†	B	
2552 *10*		C	
2570.7 *5*		A	
2571 *10*	$1/2^-$,$3/2^-$	C	J^π: L=1 in (d,p).
2596 *10*		C	
2611 *10*		C	
2630 *10*		C	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{143}Ce Levels (continued)

E(level)	J^π	XREF	Comments
2643.7 *2*		A C	
2660 *10*		C	
2695 *10*		C	
2712 *10*		C	
2728.7 *2*		A	
2742 *10*	$1/2^-,3/2^-$	C	J^π: L=1 in (d,p).
2775 *10*		C	
2815.8 *3*		A	
2825.1 *3*		A	
(5144.80 *9*)	$1/2^+$	B	

† J=1/2 or 3/2 since level is fed by dipole primary γ ray from $1/2^+$ n-capture state.

$\gamma(^{143}Ce)$

Eγ, Iγ are from β^- decay for transitions seen in β^- decay. Others are from (n,γ).

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
42.28	$5/2^-$	23.40 *5*		18.9	$7/2^-$
		42.28 *7*		0.0	$3/2^-$
632.5	$(1/2^-)$	632.3 *4*	100	0.0	$3/2^-$
640.3		621.4 *1*	100	18.9	$7/2^-$
662.7	$9/2^-$	620.3 *1*	100 *5*	42.28	$5/2^-$
		643.75 *9*	66 *3*	18.9	$7/2^-$
808.2	$3/2^-$	766.4 *2*	100 *5*	42.28	$5/2^-$
		789.3† *1*	34† *3*	18.9	$7/2^-$
		807.9 *2*	72 *6*	0.0	$3/2^-$
817.0		774.7 *1*	31 *2*	42.28	$5/2^-$
		798.14 *8*	100 *5*	18.9	$7/2^-$
862.1	$(1/2)^-$	862.2 *3*	100	0.0	$3/2^-$
1095.3		433.0 *1*	24 *2*	662.7	$9/2^-$
		1053.04 *7*	100 *6*	42.28	$5/2^-$
		1076.4 *1*	76 *5*	18.9	$7/2^-$
1116.8		454.03 *6*	100 *7*	662.7	$9/2^-$
		476.6 *2*	16 *1*	640.3	
1154.1	$3/2^-$	345.4 *7*	1.1 *5*	808.2	$3/2^-$
		1136.0 *4*	24	18.9	$7/2^-$
		1154.1 *3*	100 *3*	0.0	$3/2^-$
1165.0	(>3/2)	1122.73 *8*	41 *2*	42.28	$5/2^-$
		1146.1 *2*	100 *6*	18.9	$7/2^-$
		1164.94 *8*	45 *3*	0.0	$3/2^-$
1167.6	(>3/2)	527.3 *1*	9.5 *10*	640.3	
		1148.5 *2*	100 *5*	18.9	$7/2^-$
		1167.9 *2*	9.8 *10*	0.0	$3/2^-$
1172.5	$3/2^-,(1/2)^-$	1130.2 *4*	75 *15*	42.28	$5/2^-$
		1172.3 *4*	100 *15*	0.0	$3/2^-$
1220.0	$9/2^-$	1177.6 *3*	14 *2*	42.28	$5/2^-$
		1201.3 *3*	100 *8*	18.9	$7/2^-$
1572.4	$1/2^-,3/2^-$	1529.1 *6*	14 *3*	42.28	$5/2^-$
		1572.2 *5*	100 *11*	0.0	$3/2^-$
1598.7		1556.43 *7*	100	42.28	$5/2^-$
1620.5	$3/2,(1/2^-)$	988.3 *5*	45 *9*	632.5	$(1/2^-)$

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{143}Ce) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
1620.5	3/2,(1/2$^-$)	1578.6 *8*	100 *27*	42.28	5/2$^-$
		1620.5 *5*	73 *18*	0.0	3/2$^-$
1628.7	3/2,1/2	820.8‡ *10*	18 *9*	808.2	3/2$^-$
		1586.0 *10*	27 *9*	42.28	5/2$^-$
		1628.5 *6*	100 *27*	0.0	3/2$^-$
1676.9		559.9 *2*	66 *7*	1116.8	
		581.7 *1*	100 *7*	1095.3	
		1658.2 *2*	79 *6*	18.9	7/2$^-$
1726.7		1064.1 *3*	22 *3*	662.7	9/2$^-$
		1087.1 *4*	12 *2*	640.3	
		1707.70 *9*	100 *6*	18.9	7/2$^-$
1835.2	(1/2)$^-$	972.3 *6*	100 *12*	862.1	(1/2)$^-$
		1026.8 *7*	76 *12*	808.2	3/2$^-$
		1835.8 *6*	65 *18*	0.0	3/2$^-$
1857.0		1216.6 *3*	45 *5*	640.3	
		1838.11 *9*	100 *7*	18.9	7/2$^-$
1906.1	(7/2)$^-$	789.3† *1*	100† *10*	1116.8	
		1243.3 *4*	42 *4*	662.7	9/2$^-$
1913.4	(1/2)$^-$	741.6 *6*	<53	1172.5	3/2$^-$,(1/2)$^-$
		1106.3 *5*	100 *20*	808.2	3/2$^-$
		1912.2 *8*	100 *33*	0.0	3/2$^-$
1945.4	3/2$^-$	1902.8 *5*	100 *33*	42.28	5/2$^-$
		1928.0 *15*	33 *22*	18.9	7/2$^-$
1980.2		1937.85 *9*	33 *2*	42.28	5/2$^-$
		1961.44 *6*	100 *5*	18.9	7/2$^-$
		1980.19 *8*	34 *2*	0.0	3/2$^-$
1989.5		1172.0‡ *3*	100 *11*	817.0	
		1989.5 *4*	84 *14*	0.0	3/2$^-$
1993.3	(3/2)$^-$	820.8 *10*	6 *3*	1172.5	3/2$^-$,(1/2)$^-$
		1185.7 *6*	12 *3*	808.2	3/2$^-$
		1949.9 *2*	100 *9*	42.28	5/2$^-$
		1993.2 *4*	18 *3*	0.0	3/2$^-$
2027.4	(1/2$^-$)	1165.2 *5*	75 *12*	862.1	(1/2)$^-$
		2027.9 *8*	100 *19*	0.0	3/2$^-$
2057.0		1240.0 *2*	100	817.0	
2061.5	3/2$^-$	489.8 *3*	22 *9*	1572.4	1/2$^-$,3/2$^-$
		2018.8 *4*	100 *19*	42.28	5/2$^-$
		2042.9 *8*	22 *9*	18.9	7/2$^-$
		2061.3 *6*	41 *9*	0.0	3/2$^-$
2065.3		948.6 *2*	66 *6*	1116.8	
		1248.3 *4*	100 *8*	817.0	
2202.0	1/2,3/2	2201.8 *4*	100	0.0	3/2$^-$
2215.9	(3/2)$^-$	2174.0 *6*	100	42.28	5/2$^-$
2232.1	(3/2)$^-$	2190.3 *5*	100 *38*	42.28	5/2$^-$
		2231.3 *8*	25 *13*	0.0	3/2$^-$
2255.3		1592.6 *2*	100	662.7	9/2$^-$
2272.7?	1/2$^-$,3/2	1117.4 *10*	100 *50*	1154.1	3/2$^-$
		2231.3 *8*	100 *50*	42.28	5/2$^-$
		2271.2 *15*	100 *35*	0.0	3/2$^-$
2307.2	(5/2$^-$,7/2$^-$)	1139.4 *2*	100 *9*	1167.6	(>3/2)
		1212.0 *3*	36 *4*	1095.3	
2313.9	3/2$^-$,1/2$^-$	738.4 *6*	<100	1572.4	1/2$^-$,3/2$^-$
		1505.9 *7*	75 *25*	808.2	3/2$^-$
		1681.3 *8*	100 *38*	632.5	(1/2$^-$)
		2271.2 *15*	25 *8*	42.28	5/2$^-$

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{143}Ce)$ (continued)

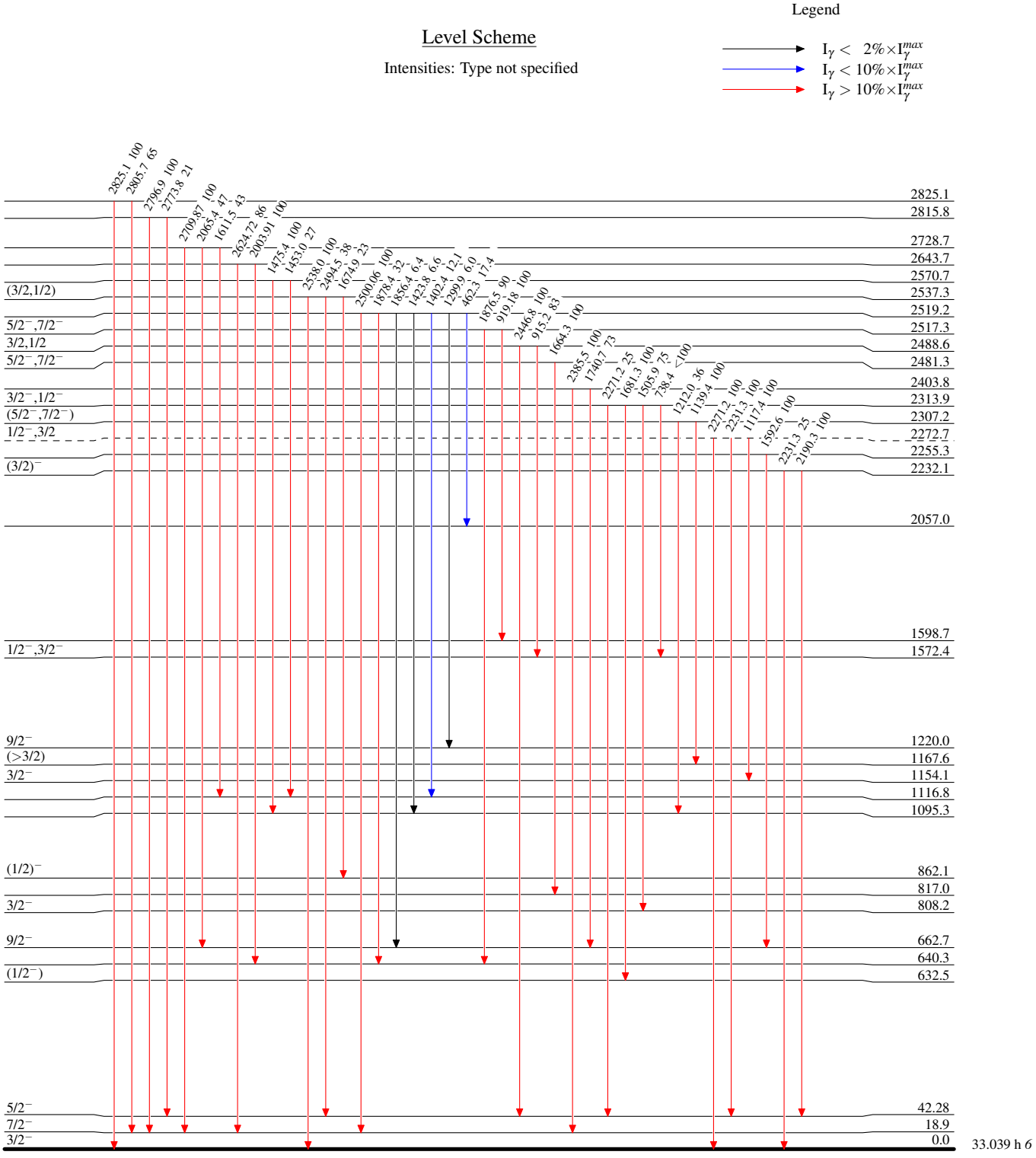
E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
2403.8		1740.7 *2*	73 *7*	662.7	$9/2^-$
		2385.5 *2*	100 *8*	18.9	$7/2^-$
2481.3	$5/2^-,7/2^-$	1664.3 *3*	100	817.0	
2488.6	3/2,1/2	915.2 *7*	83 *17*	1572.4	$1/2^-,3/2^-$
		2446.8 *15*	100 *50*	42.28	$5/2^-$
2517.3	$5/2^-,7/2^-$	919.18 *10*	100 *7*	1598.7	
		1876.5 *3*	90 *7*	640.3	
2519.2		462.3 *1*	17.4 *15*	2057.0	
		1299.9 *3*	6.0 *8*	1220.0	$9/2^-$
		1402.4 *3*	12.1 *12*	1116.8	
		1423.8 *3*	6.6 *11*	1095.3	
		1856.4 *3*	6.4 *11*	662.7	$9/2^-$
		1878.4 *2*	32 *3*	640.3	
		2500.06 *5*	100 *5*	18.9	$7/2^-$
2537.3	(3/2,1/2)	1674.9 *8*	23 *8*	862.1	$(1/2)^-$
		2494.5 *8*	38 *23*	42.28	$5/2^-$
		2538.0 *10*	100 *15*	0.0	$3/2^-$
2570.7		1453.0 *3*	27 *3*	1116.8	
		1475.4 *3*	100 *8*	1095.3	
2643.7		2003.91 *8*	100 *6*	640.3	
		2624.72 *6*	86 *6*	18.9	$7/2^-$
2728.7		1611.5 *3*	43 *9*	1116.8	
		2065.4 *3*	47 *9*	662.7	$9/2^-$
		2709.87 *8*	100 *8*	18.9	$7/2^-$
2815.8		2773.8 *5*	21 *7*	42.28	$5/2^-$
		2796.9 *3*	100 *10*	18.9	$7/2^-$
2825.1		2805.7 *3*	65 *6*	18.9	$7/2^-$
		2825.1 *3*	100 *8*	0.0	$3/2^-$

† Multiply placed with intensity suitably divided.
‡ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



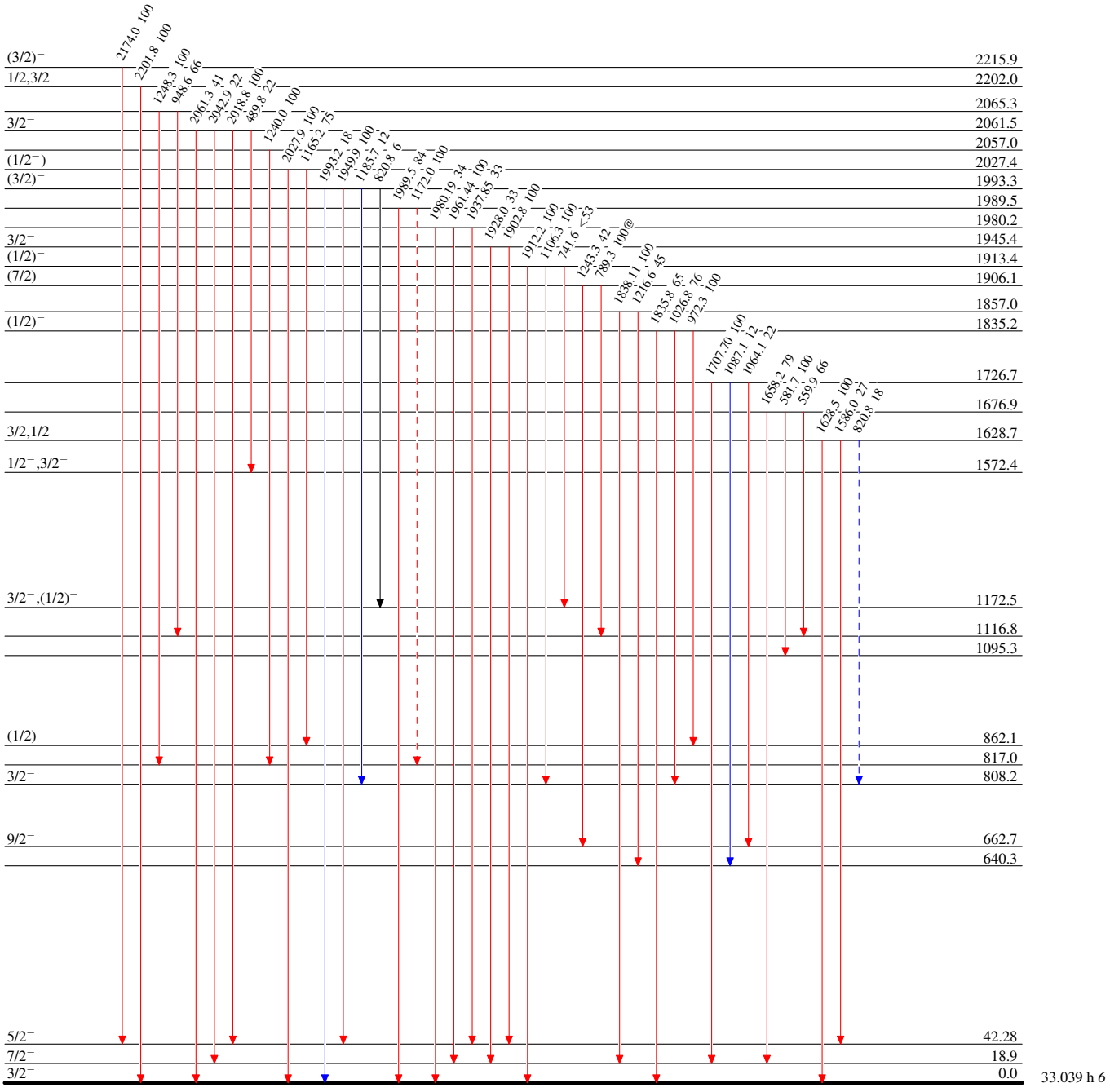
$^{143}_{58}Ce_{85}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
@ Multiply placed: intensity suitably divided

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)



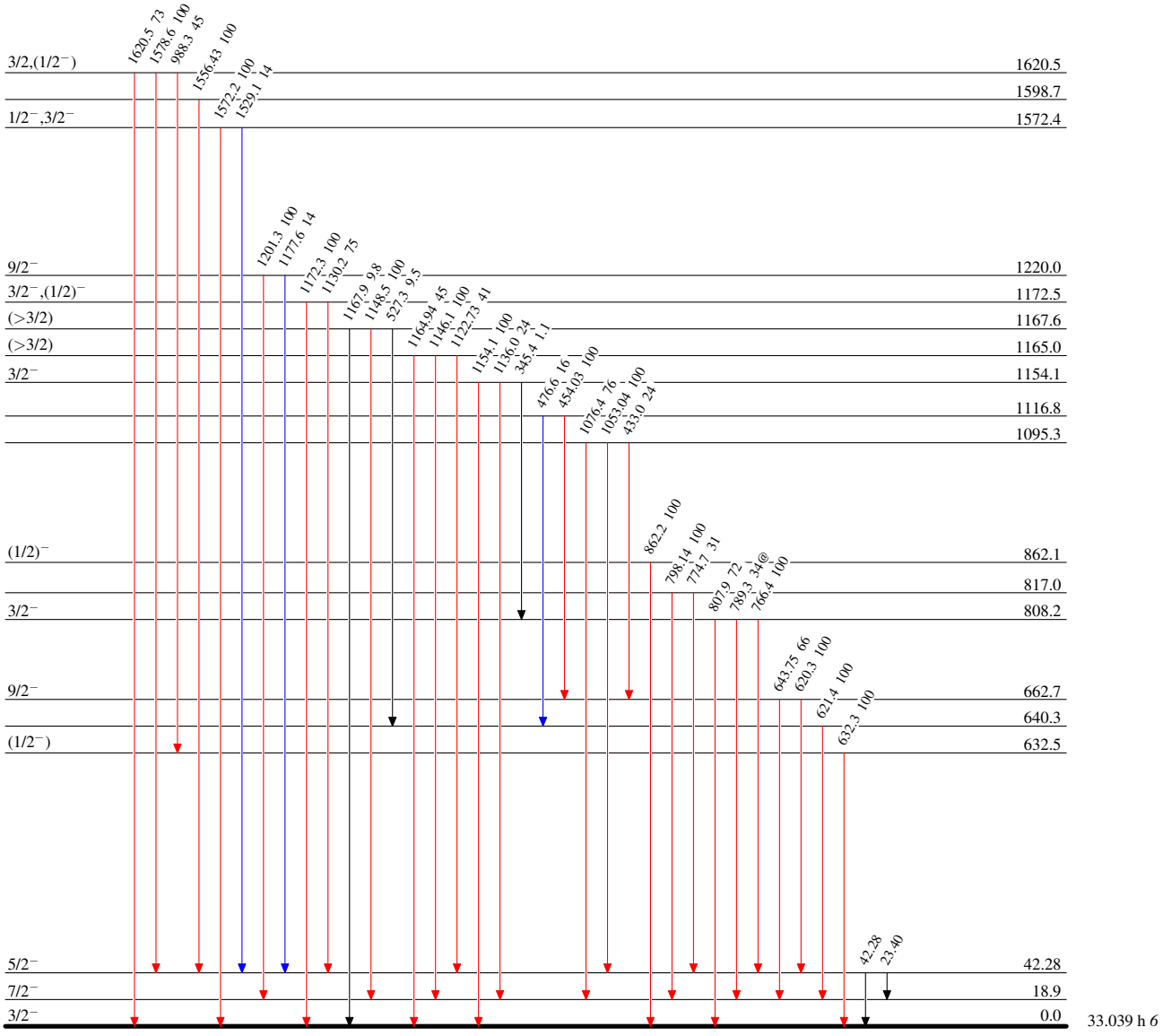
$^{143}_{58}Ce_{85}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{143}_{58}Ce_{85}$