Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 103,1 (2004)	31-Jul-2004

Q(β^-)=−1233.1 *9*; S(n)=8552 *3*; S(p)=9527 *5*; Q(α)=−3196.3 *9* 2012Wa38
Note: Current evaluation has used the following Q record −1233.3 8 *8552* 3 *9527* 5 −3198.0 *21* 2003Au03.
Q($2\beta^-$)=825.4 *9* (2003Au03).
Double Beta Decay: With a Q($2\beta^-$)=825.4 *9*, it is possible that ^{134}Xe decays to ^{134}Ba through $2\beta^-$. The table below lists experimental $T_{1/2}$ upper limits for different decays modes. Results from 1989Ba22, an earlier version of 1990Ba22, are not listed.

^{134}Xe Levels

Cross Reference (XREF) Flags

A	^{134}I β^- decay (52.5 min)	E	Coulomb excitation
B	^{134}I β^- decay (3.52 min)	F	^{138}Ba(d,^{6}Li)
C	^{134}Xe IT decay (290 ms)	G	^{134}Xe IT decay (5 μs)
D	^{134}Cs ε decay (2.0652 y)	H	^{134}Xe(n,n′γ)

$T_{1/2}(2\beta^-,0\nu)(0^+$ to $0^+)$:
  2002Be11: >5.8×10^{22} y (90% confidence)
  2002Be74: >7.8×10^{22} y (68% confidence)
  1990Ba22: >7.8×10^{19} y (68% confidence)
$T_{1/2}(2\beta^-,0\nu)(0^+$ to $2^+)$:
  2002Be11: >2.6×10^{22} y (90% confidence)
$T_{1/2}(2\beta^-,2\nu)(0^+$ to $0^+)$:
  1990Ba22: >1.1×10^{16} y (≈ 100% confidence)

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	0$^+$	>5.8×10^{22} y	ABCDEFGH	%$2\beta^-$≥0 T$_{1/2}$: from 2002Be11, considered to be the most precised of all T$_{1/2}$ measurements, see table above for details.
847.041 *23*	2$^+$	2.08 ps *14*	ABCDEFGH	μ=+0.708 *14*; B(E2)↑=0.312 *21* J$^\pi$: E2 γ to 0$^+$ g.s. T$_{1/2}$: from Coul. ex. (2002Ja02). MOMM1,BE2 From Coul. ex. (2002Ja02).
1613.77 *3*	(2)$^+$		A H	J$^\pi$: M1+E2 γ to 2$^+$, γ to 0$^+$ g.s.
1636.2 *10*	(0$^+$)		H	
1731.17 *3*	4$^+$	2.22 ps *14*	ABC E GH	μ=+3.2 *6* μ: From Coul. ex. (2002Ja02). J$^\pi$: E3 γ from 7$^-$, E2 γ to 2$^+$. T$_{1/2}$: from Coul. ex. (2002Ja02).
1919.60 *3*	3$^+$		A H	J$^\pi$: M1+E2 γ to 2$^+$, γ to 4$^+$ but not γ to 0$^+$.
1946.8 *7*			H	
1965.5 *5*	7$^-$	290 ms *17*	BC H	%IT=100 J$^\pi$: Systematics of N=80 nuclei, log *ft*=7.1 from (8$^-$). T$_{1/2}$: from ^{134}Xe IT decay (290 ms).
2082.0 *6*	(4$^+$)		H	
2116.4 *10*	(2,3,4)		H	
2136.60 *21*			A H	In 1969Wi16, the level scheme was built with the 405-keV γ and the 217-keV γ depopulating the same level. In 2001Ge07, however, the γ-rays in coincidence with the 405 γ are not in coincidence with the 217 γ. As a consequence, the adopted level scheme is built assuming they originate from 2 different levels, very close in energy.
2136.61 *4*	6$^+$		A GH	See comment for the level below. J$^\pi$: E2 γ to 4$^+$ and systematics of N=80 Nuclei.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{134}Xe Levels (continued)

E(level)†	J^π	$T_{1/2}$	XREF	Comments
2207.9 *10*			H	
2262.7 *7*	(2^+)		H	J^π: γ's to 2^+ and 0^+.
2272.01 *4*	5^+		A H	J^π: M1(+E2) γ to 6^+ and M1+E2 γ to 4^+.
2294.2 *10*			H	
2302.25 *6*	$(3,4^+)$‡		A H	
2352.97 *3*	$(4)^+$		A H	J^π: M1+E2 γ to 4^+, γ to 2^+.
2389.1 *7*	(1)		H	
2408.50 *4*	(5^+)		A H	J^π: (M1+E2) γ to 4^+, γ to 3^+.
2417.4	(1,2,3,4)		H	
2547.55 *4*	$4^+,5^+$		A H	J^π: M1,E2 γ to 3^+ and γ to 6^+.
2560.6 *10*	(2^+)		H	
2580.4 *10*			H	
2588.46 *3*	$(4)^+$		A H	J^π: M1+E2 γ to 4^+, γ's to 2^+.
2653.90 *5*	$3^{(+)}$		A H	J^π: γ's to 2^+ and 4^+.
2772.90 *7*	$(3,4^+)$‡		A H	
2867.38 *3*	$(4)^+$		A H	J^π: M1+E2 γ's to 3^+ and 4^+, γ's to $(5)^+$ and 6^+.
2997.2 *10*	(8^+)		G	J^π: γ to 6^+ and systematics of N=80 Nuclei.
3025.2 *15*	(10^+)	5 μs *1*	G	J^π: E2 γ to (8^+) and systematics of N=80 Nuclei. $T_{1/2}$: from 2001Ge07.
3083.78 *6*	$(3,4^+)$‡		A	
3255.74 *17*	$(3,4^+)$‡		A	
3300.0 *3*			A	
3314.5 *3*	$(3,4^+)$‡		A	
3360.47 *7*	$(3,4^+)$‡		A	
3375.39 *5*	(4,5)		A	J^π: log *ft*=6.4 from $(4)^+$, γ to 6^+.
3477.0 *3*			A	
3492.29 *10*	$(3,4^+)$‡		A	

† From least-squares fit to Eγ, assuming ΔEγ=1 keV when unknown.

‡ log *ft*=6.3-7.8 in β^- decay from $(4)^+$ parent, γ to 2^+.

$\gamma(^{134}Xe)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.†	δ†	α‡	Comments
847.041	2^+	847.025 *25*	100	0.0	0^+	E2		0.00237	B(E2)(W.u.)=15.3 *11* α(K)=0.00202 *6*; α(L)=0.00026 *1*
1613.77	$(2)^+$	766.68 *4*	96 *3*	847.041	2^+	M1+E2	−2.4 *2*	0.00315 *3*	α(K)=0.00268 *2*; α(L)=0.00035
		1613.80 *4*	100 *5*	0.0	0^+	[E2]			
1636.2	(0^+)	789.22		847.041	2^+				
1731.17	4^+	884.090 *25*	100	847.041	2^+	E2		0.00215	B(E2)(W.u.)=11.6 *8* α(K)=0.00183 *6*; α(L)=0.00024 *1*
1919.60	3^+	188.47 *4*	5.1 *4*	1731.17	4^+	M1,E2		0.17 *3*	α(K)=0.138 *17*; α(L)=0.025 *9*; α(M)=0.0051 *20*; α(N+..)=0.0013 *5*
		1072.55 *3*	100 *4*	847.041	2^+	M1+E2	+0.16 *2*	0.00185	α(K)=0.00159; α(L)=0.00020
1946.8		1099.77		847.041	2^+				
		1946.85		0.0	0^+				
1965.5	7^-	234.3 *5*	100	1731.17	4^+	E3		0.429	B(E3)(W.u.)=0.071 *5* α(K)=0.284 *9*; α(L)=0.114 *4*; α(M)=0.0245 *8*; α(N+..)=0.00601 *18* Additional information 1.
2082.0	(4^+)	162.35		1919.60	3^+				
		350.96		1731.17	4^+				
		468.24		1613.77	$(2)^+$				
2116.4	(2,3,4)	1269.39		847.041	2^+				
2136.60		217.0 *2*		1919.60	3^+				
2136.61	6^+	405.451 *20*	100	1731.17	4^+	E2		0.0164	α(K)=0.0138 *5*; α(L)=0.00213 *7*; α(M)=0.00043 *1*; α(N+..)=0.00011
2207.9		1360.9		847.041	2^+				
2262.7	(2^+)	1415.34		847.041	2^+				
		2262.9		0.0	0^+				
2272.01	5^+	135.399 *22*	56 *4*	2136.61	6^+	M1(+E2)		0.49 *14*	α(K)=0.38 *8*; α(L)=0.09 *5*; α(M)=0.018 *10*; α(N+..)=0.0043 *23* See comment on 2136 keV level. This γ ray was seen in coincidence with both 405 keV γ and 217 keV γ, as a result, it could be a doublet of 2 γ-rays very close in energy.
		540.825 *25*	100.0 *25*	1731.17	4^+	M1+E2	−1.92 *10*	0.00774 *4*	α(K)=0.00654 *4*; α(L)=0.00090
2294.2		1447.19		847.041	2^+				
2302.25	$(3,4^+)$	570.75 *15*	13 *4*	1731.17	4^+				
		1455.24 *5*	100 *9*	847.041	2^+				
2352.97	$(4)^+$	433.35 *3*	39.1 *14*	1919.60	3^+	M1(+E2)	+0.08 *6*	0.0160	α(K)=0.0138; α(L)=0.00176; α(M)=0.00035
		621.790 *25*	100 *4*	1731.17	4^+	M1+E2	−0.76 *5*	0.00607 *5*	α(K)=0.00518 *5*; α(L)=0.00067
		739.18 *8*	6.5 *5*	1613.77	$(2)^+$	[E2]		0.00327	α(K)=0.00278 *9*; α(L)=0.00037 *1*
2389.1	(1)	1542.17		847.041	2^+				
		2389.0		0.0	0^+				
2408.50	(5^+)	488.88 *4*	18.3 *8*	1919.60	3^+	[E2]		0.0096	α(K)=0.00808 *25*; α(L)=0.00118 *4*; α(M)=0.00024 *1*

$\gamma(^{134}Xe)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.†	δ†	α‡	Comments
2408.50	(5+)	677.34 *3*	100 *4*	1731.17	4+	(M1+E2)	−0.32 *2*	0.00529 *2*	α(K)=0.00454 *1*; α(L)=0.00057
2417.4	(1,2,3,4)	1570.34	100	847.041	2+				
2547.55	4+,5+	139.03 *3*	34.1 *18*	2408.50	(5+)	(M1,E2)		0.45 *13*	α(K)=0.35 *7*; α(L)=0.08 *4*; α(M)=0.016 *9*; α(N+..)=0.0039 *21*
		411.00 *8*	25.9 *18*	2136.61	6+				
		627.96 *3*	100 *6*	1919.60	3+	M1,E2		0.0057 *8*	α(K)=0.0049 *7*; α(L)=0.00063 *7*
		816.38 *7*	28 *3*	1731.17	4+				
2560.6	(2+)	152.124		2408.50	(5+)				
2580.4		1733.33		847.041	2+				
2588.46	(4)+	235.471 *26*	31.9 *23*	2352.97	(4)+	M1+(E2)		0.085 *8*	α(K)=0.071 *4*; α(L)=0.012 *3*; α(M)=0.0024 *7*; α(N+..)=0.00058 *15*
		857.29 *3*	100 *3*	1731.17	4+	M1+E2	−0.64 *10*	0.00288 *6*	α(K)=0.00247 *5*; α(L)=0.00031 *1*
		974.67 *4*	71 *3*	1613.77	(2)+	[E2]		0.00173	α(K)=0.00148 *5*; α(L)=0.00019 *1*
		1741.49 *5*	38.3 *23*	847.041	2+	[E2]			
2653.90	3(+)	922.6 *3*	2.6 *6*	1731.17	4+	[M1,E2]		0.0023 *4*	α(K)=0.0020 *3*; α(L)=0.00025 *4*
		1040.25 *10*	37 *3*	1613.77	(2)+	(M1+E2)	−0.09 *3*	0.00199	α(K)=0.00171; α(L)=0.00021
		1806.84 *4*	100 *4*	847.041	2+	(M1+E2)	−0.10 *3*		
2772.90	(3,4+)	1159.10 *8*	100 *9*	1613.77	(2)+				
		1925.88 *10*	53 *9*	847.041	2+				
2867.38	(4)+	278.80 *15*	1.29 *18*	2588.46	(4)+	[M1,E2]		0.0515 *17*	α(K)=0.0433 *4*; α(L)=0.0066 *11*; α(M)=0.00135 *24*; α(N+..)=0.00034 *6*
		319.81 *6*	4.1 *3*	2547.55	4+,5+				
		458.92 *6*	11.8 *6*	2408.50	(5+)	[M1,E2]		0.0127 *13*	α(K)=0.0108 *12*; α(L)=0.00148 *5*; α(M)=0.00030 *1*
		514.40 *3*	20.2 *8*	2352.97	(4)+	[M1,E2]		0.0095 *11*	α(K)=0.0080 *11*; α(L)=0.00108 *7*
		595.362 *20*	100 *4*	2272.01	5+	M1+E2	−0.32 *20*	0.0072 *2*	α(K)=0.0062 *2*; α(L)=0.00078 *2*
		730.74 *4*	16.5 *7*	2136.61	6+				
		947.86 *4*	36.1 *12*	1919.60	3+	M1+E2	−0.4 *1*	0.00238 *4*	α(K)=0.00204 *4*; α(L)=0.00025
		1136.16 *4*	82 *6*	1731.17	4+	M1+E2	+0.48 *2*	0.00156 *1*	α(K)=0.00134 *1*; α(L)=0.00016
		2020.6 *3*	1.7 *3*	847.041	2+	[E2]			
2997.2	(8+)	860.6	100	2136.61	6+				
3025.2	(10+)	28 *1*		2997.2	(8+)	E2			B(E2)(W.u.)=1.6×10^2 *5*
3083.78	(3,4+)	1164.0 *3*	18 *4*	1919.60	3+				
		1352.62 *8*	54 *4*	1731.17	4+				
		1470.00 *7*	100 *5*	1613.77	(2)+				
		2236.7 *5*	7.1 *19*	847.041	2+				
3255.74	(3,4+)	1336.0 *2*	100 *20*	1919.60	3+				
		2409.0 *3*	55 *7*	847.041	2+				
3300.0		2452.9 *3*	100	847.041	2+				
3314.5	(3,4+)	1395 *1*	57 *15*	1919.60	3+				
		2467.4 *3*	100 *15*	847.041	2+				
3360.47	(3,4+)	706.65 *10*	100 *7*	2653.90	3(+)				

$^{134}_{54}Xe_{80}$-4

Adopted Levels, Gammas (continued)

$\gamma(^{134}Xe)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f
3360.47	(3,4$^+$)	1629.24 *8*	23 *5*	1731.17	4$^+$
		2513.3 *3*	8.0 *10*	847.041	2$^+$
3375.39	(4,5)	966.90 *5*	49 *5*	2408.50	(5$^+$)
		1103.18 *12*	100 *8*	2272.01	5$^+$
		1239.0 *3*	26 *8*	2136.61	6$^+$
3375.39	(4,5)	1644.25 *7*	49 *5*	1731.17	4$^+$
3477.0		162.48[#] *7*	100 *10*	3314.5	(3,4$^+$)
		2629.9 *3*	23.3 *24*	847.041	2$^+$
3492.29	(3,4$^+$)	1190.03 *8*	100 *9*	2302.25	(3,4$^+$)
		2646 *2*	≈5.4	847.041	2$^+$

† From ^{134}I β^- Decay (52.5 min), unless otherwise noted.

‡ 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.

Placement of transition in the level scheme is uncertain.

$^{134}_{54}Xe_{80}$-5

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

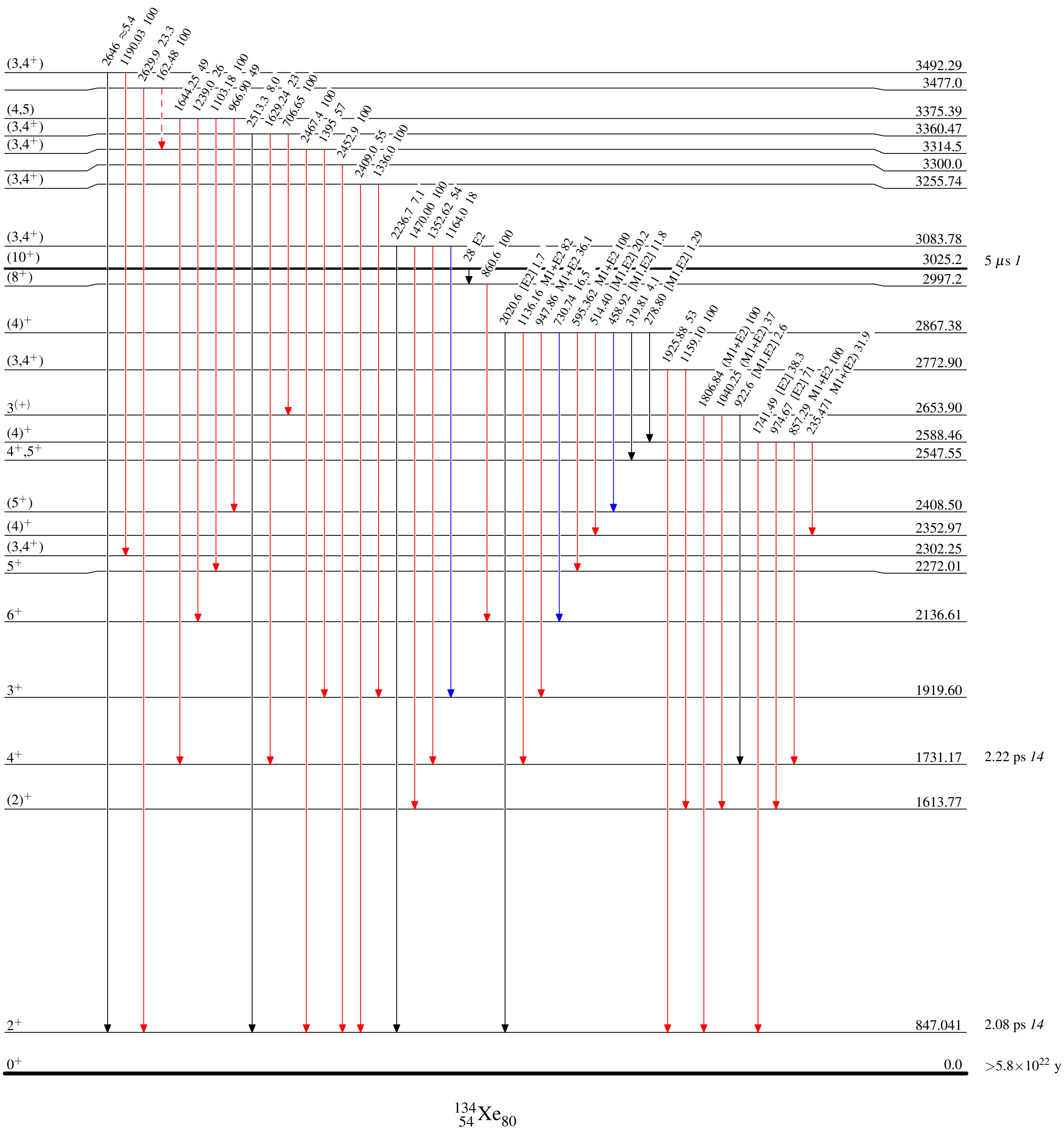
Legend

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

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

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

γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

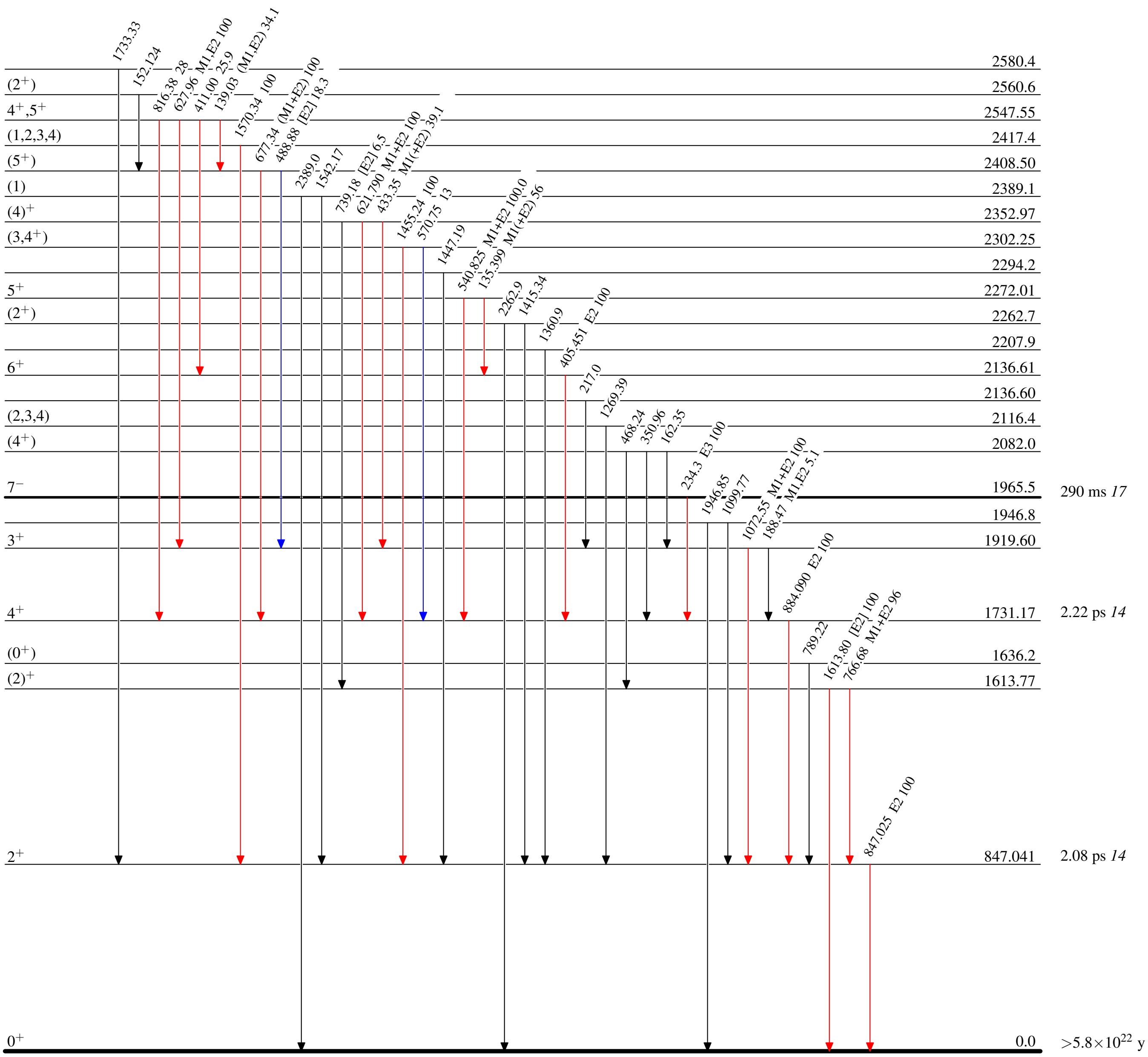
Intensities: Type not specified

Legend

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

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

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



$^{134}_{54}Xe_{80}$