Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Alexander A. Rodionov And Yuri L. Khazov	NDS 109,517 (2008)	22-Jan-2008

Q(β^-)=1165 *4*; S(n)=6364 *5*; S(p)=9647 *7*; Q(α)=−3631 *5* 2012Wa38
Note: Current evaluation has used the following Q record 1165 4 *6364* 5 *9634* 9 −3632 5 2003Au03.
^{136}Xe(d,^{3}He) E=500 MeV: 2005Ba34: search for deeply-bound pionic states. The peak observed at ≈363 MeV with dσ/dΩ=40 μb/sr is ascribed to deeply-bound pionic 1s state in ^{135}Xe.
Nuclear structure calculations: 2002Hi08 (levels, bands, shell-model), 1995To12 (Gamow-Teller β transition rates), 1983Hs02 and 1973He14 (levels, transition rates).
Additional information 1.

^{135}Xe Levels

Cross Reference (XREF) Flags

A	^{135}I β^- decay (6.58 h)	D	^{136}Xe(d,t)
B	^{135}Xe IT decay (15.29 min)	E	^{208}Pb(^{18}O,Fγ)
C	^{136}Xe(p,d)		

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	3/2$^+$	9.14 h *2*	ABCDE	%β^-=100 μ=+0.9032 *7* (1990NeZY) Q=+0.214 *7* (1990NeZY) μ,Q: collinear fast beam LASER spectroscopy (1990NeZY). Other: μ=0.90305 *22* (1987CaZU,1989Ra17) from nuclear-magnetic resonance and optical pumping with radiative detection. See also 2005St24 compilation. J$^\pi$: L(p,d)=L(d,t)=2; M4 γ between 526.551, L(p,d)=5 level and g.s. with L(p,d)=2. T$_{1/2}$: weighted average of 9.104 h *20* (1975Ho18), 9.083 h *13* (1974FoZY), 9.20 h *3* (1973Sa27), 9.172 h *5* (1971Ha13), 9.14 h *10* (1968Al16), 9.14 h *3* (1965An05), 9.19 h *4* (1964Cl01), 9.13 h *5* (1953Br11).
288.455 *15*	1/2$^+$		A CD	J$^\pi$: L(p,d)=L(d,t)=0.
526.551 *13*	11/2$^-$	15.29 min *5*	ABCDE	%IT>99.4; %β^-<0.6 μ=−1.1036 *14* (1990NeZY) Q=+0.618 *21* (1990NeZY) %IT=99.4 to 999.996. %β^-=0.004 to 0.6. μ,Q: collinear fast beam LASER spectroscopy (1990NeZY). Other: μ=1.10304 *20* (1987CaZU,1989Ra17) from nuclear-magnetic resonance and optical pumping with radiative detection. See also 2005St24 compilation. %β^-=0.004 to 0.6 from I(γ's to ^{135}Cs)/I(526γ,^{135}Xe)=4.9×10^{-5} (1974MeZV, 1982Wa21) and log $f^{1u}t$>8.5 for β^- transition to 7/2$^+$ (^{135}Cs g.s.). J$^\pi$: L(p,d)=L(d,t)=5; M4 γ between this level and g.s. with L(p,d)=2. T$_{1/2}$: from 1975Fu12. Others: 15.287 min *22* (1971Ha13), 15.2 min *7* (1968Al16), 15.65 min *10* (1960Ko02), 15.8 min *4* (1960Al12).
1131.512 *11*	7/2$^+$		A	J$^\pi$: E2 γ to 3/2$^+$; (M1+E2) γ from 9/2$^+$; $\gamma\gamma(\theta)$.
1260.416 *13*	5/2$^+$		A D	XREF: D(1280). J$^\pi$: M1+E2 γ to 3/2$^+$; log *ft*=7.0 from 7/2$^+$.
1448.36 *3*	(3/2$^+$)		A	J$^\pi$: γ to 1/2$^+$; γ from (7/2)$^+$.
1457.566 *15*	5/2$^+$		A D	XREF: D(1470). J$^\pi$: M1,E2 γ to 3/2$^+$; γ to 1/2$^+$; log *ft*=7.3 from 7/2$^+$.
1543.70 *17*	(1/2$^+$)		A d	J$^\pi$: L(d,t)=(0+4) for 1530 *30* group which is possibly a doublet.
1565.288 *16*	9/2$^+$		A d	J$^\pi$: E1 γ to 11/2$^-$; log *ft*=7.1 from 7/2$^+$. See also comment for 1543.7 level.
1678.065 *12*	(7/2)$^+$		A	J$^\pi$: $\gamma\gamma(\theta)$; M1+E2 γ to 5/2$^+$.
1748.5 *4*	(15/2$^-$)#		E	
1781.39 *3*	(11/2)$^+$		A	J$^\pi$: γ's to 7/2$^+$ and 11/2$^-$; $\gamma\gamma(\theta)$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{135}Xe Levels (continued)

E(level)[†]	J^{π}	XREF	Comments
1791.213 *19*	$5/2^+$	A D	XREF: D(1830). J^{π}: L(d,t)=2; log *ft*=6.7 from $7/2^+$.
1849.8? *4*	$(13/2^-)$[#]	E	
1894.45 *5*	(7/2,9/2)	A	J^{π}: log *ft*=7.6 from $7/2^+$; γ to $11/2^-$.
1927.294 *23*	$(5/2^+,7/2^+)$	A	J^{π}: γ's to $3/2^+$ and $9/2^+$.
1968.323 *17*	$(9/2)^+$	A	J^{π}: γ's to $5/2^+$ and $11/2^-$; $\gamma\gamma(\theta)$.
2045.892 *24*	$(5/2^+,7/2^+)$	A	J^{π}: (M1+E2) γ to $5/2^+$; log *ft*=7.2 from $7/2^+$.
2048.55 *7*		A	
2058.4 *6*	$(19/2^-)$[#]	E	
2092.943 *22*	$(7/2^-,9/2)$[‡]	A	
2112.4 *5*	$(5/2)^+$	A D	XREF: D(2100). J^{π}: L(d,t)=2; possible β feeding from $7/2^+$.
2151.52 *10*		A	
2168.9? *8*	$(17/2^-)$[#]	E	
2233.041 *19*	$(9/2^+)$	A	J^{π}: (M1+E2) γ to $7/2^+$; intense γ to $11/2^-$; $\gamma\gamma(\theta)$.
2255.479 *17*	$(7/2^+)$	A	J^{π}: (M1+E2) γ's to $5/2^+$ and $7/2^+$; $\gamma\gamma(\theta)$.
2356.5 *8*		E	
2357.24 *3*	$(9/2^+)$	A	J^{π}: γ's to $5/2^+$, $(11/2)^+$ and $11/2^-$.
2371.99 *4*	$7/2^{(+)},9/2^{(+)}$	A	J^{π}: log *ft*=5.9 from $7/2^+$; γ's to $7/2^+$ and $11/2^-$.
2387.5? *11*		E	
2408.66 *3*	$(5/2,7/2^+)$[‡]	A	
2447.30 *8*		A	
2466.11 *9*	$(7/2^+)$	A	J^{π}: γ's to $3/2^+$ and $(11/2)^+$.
2475.08 *5*	$(7/2^-,9/2)$[‡]	A	
2477.87? *20*	(5/2)	A	J^{π}: log *ft*=7.0 from $7/2^+$; γ to $1/2^+$.
2570.7 *8*		E	
2710.6? *11*		E	
3169.9 *9*		E	

[†] From least-squares fit to Eγ's. Six resonances at E(n)=0.33900, 1.0006, 2.1860, 6.315, 7.260 and 9.383 keV are listed in the dataset: ^{134}Xe(n,γ):resonances.

[‡] From the deexcitation pattern and log *ft* value.

[#] From shell-model predictions (2007Fo03).

$\gamma(^{135}Xe)$

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.#	δ@	α&	Comments
288.455	$1/2^+$	288.451 *16*	100	0.0	$3/2^+$	[M1,E2]		0.0463 *14*	α(K)=0.0389 *6*; α(L)=0.0059 *9*; α(M)=0.00121 *20*; α(N+..)=0.00028 *4* α(N)=0.00025 *4*; α(O)=2.9×10^{-5} *4*
526.551	$11/2^-$	526.561 *17*	100	0.0	$3/2^+$	M4		0.237	B(M4)(W.u.)=3.292 *22* α(K)=0.191 *3*; α(L)=0.0364 *5*; α(M)=0.00770 *11*; α(N+..)=0.001777 *25* α(N)=0.001587 *23*; α(O)=0.000190 *3* E_γ: from ^{135}I β^- decay.
1131.512	$7/2^+$	1131.511 *18*	100	0.0	$3/2^+$	E2		1.25×10^{-3}	α(K)=0.001074 *15*; α(L)=0.0001359 *19*; α(M)=2.75×10^{-5} *4*; α(N+..)=7.61×10^{-6} *11* α(N)=5.67×10^{-6} *8*; α(O)=7.06×10^{-7} *10*; α(IPF)=1.232×10^{-6} *18*
1260.416	$5/2^+$	971.96‡	3.1 *1*	288.455	$1/2^+$				
		1260.409 *17*	100.0 *6*	0.0	$3/2^+$	M1+E2	+0.56 *5*	1.22×10^{-3} *2*	α(K)=0.001043 *17*; α(L)=0.0001285 *20*; α(M)=2.59×10^{-5} *4*; α(N+..)=2.04×10^{-5} *3* α(N)=5.37×10^{-6} *9*; α(O)=6.76×10^{-7} *11*; α(IPF)=1.435×10^{-5} *21*
1448.36	$(3/2^+)$	1159.9 *2*	33 *8*	288.455	$1/2^+$				
		1448.35 *10*	100 *9*	0.0	$3/2^+$				
1457.566	$5/2^+$	197.19 *7*	0.38 *3*	1260.416	$5/2^+$	[M1,E2]		0.146 *23*	α(K)=0.120 *14*; α(L)=0.021 *8*; α(M)=0.0044 *16*; α(N+..)=0.0010 *4* α(N)=0.0009 *3*; α(O)=0.00010 *3*
		326.0 *2*	0.03 *2*	1131.512	$7/2^+$				
		1169.04 *4*	10.1 *3*	288.455	$1/2^+$				
		1457.56 *3*	100.0 *7*	0.0	$3/2^+$	M1,E2		0.00090 *9*	α(K)=0.00072 *8*; α(L)=8.9×10^{-5} *9*; α(M)=1.79×10^{-5} *19*; α(N+..)=6.79×10^{-5} *13* α(N)=3.7×10^{-6} *4*; α(O)=4.7×10^{-7} *5*; α(IPF)=6.37×10^{-5} *16*
1543.70	$(1/2^+)$	1254.8 *10*	22 *12*	288.455	$1/2^+$				
		1543.7 *2*	100 *40*	0.0	$3/2^+$				
1565.288	$9/2^+$	304.91 *13*	0.40 *4*	1260.416	$5/2^+$				
		433.741 *19*	6.97 *18*	1131.512	$7/2^+$	(M1+E2)	−0.52 *10*	0.0154 *3*	α(K)=0.01319 *24*; α(L)=0.001732 *25*; α(M)=0.000352 *5*; α(N+..)=8.16×10^{-5} *12* α(N)=7.26×10^{-5} *11*; α(O)=9.01×10^{-6} *14*
		1038.760 *21*	100.0 *11*	526.551	$11/2^-$	E1		6.37×10^{-4}	α(K)=0.000553 *8*; α(L)=6.68×10^{-5} *10*; α(M)=1.344×10^{-5} *19*; α(N+..)=3.13×10^{-6} *5* α(N)=2.78×10^{-6} *4*; α(O)=3.49×10^{-7} *5*
1678.065	$(7/2)^+$	112.78‡	≈0.132	1565.288	$9/2^+$				
		220.502 *15*	18.3 *3*	1457.566	$5/2^+$	M1,E2		0.104 *12*	α(K)=0.086 *7*; α(L)=0.014 *4*; α(M)=0.0030 *9*;

$^{135}_{54}Xe_{81}$-3

Adopted Levels, Gammas (continued)

$\gamma(^{135}Xe)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[#]	δ[@]	α[&]	Comments
									α(N+..)=0.00067 *19* α(N)=0.00060 *17*; α(O)=7.0×10^{-5} *16*
1678.065	(7/2)$^+$	229.72 *3*	2.523 *24*	1448.36	(3/2$^+$)	[E2]		0.1006	α(K)=0.0809 *12*; α(L)=0.01570 *22*; α(M)=0.00327 *5*; α(N+..)=0.000734 *11* α(N)=0.000660 *10*; α(O)=7.37×10^{-5} *11*
		417.633 *22*	36.9 *3*	1260.416	5/2$^+$	M1+E2	−1.86 *20*	0.01559 *24*	α(K)=0.01319 *21*; α(L)=0.00192 *3*; α(M)=0.000394 *6*; α(N+..)=9.03×10^{-5} *13* α(N)=8.06×10^{-5} *12*; α(O)=9.67×10^{-6} *14*
		546.557 *16*	74.8 *9*	1131.512	7/2$^+$	(M1+E2)	−0.14 *5*	0.00891	α(K)=0.00770 *12*; α(L)=0.000971 *14*; α(M)=0.000196 *3*; α(N+..)=4.58×10^{-5} *7* α(N)=4.07×10^{-5} *6*; α(O)=5.11×10^{-6} *8*
		1151.51[a]	<0.03	526.551	11/2$^-$				E_γ: from level-energy difference.
		1678.027 *21*	100.0 *21*	0.0	3/2$^+$	(E2)		7.16×10^{-4}	α(K)=0.000492 *7*; α(L)=6.03×10^{-5} *9*; α(M)=1.216×10^{-5} *17*; α(N+..)=0.0001517 *22* α(N)=2.52×10^{-6} *4*; α(O)=3.16×10^{-7} *5*; α(IPF)=0.0001488 *21*
1748.5	(15/2$^-$)	1221.9 *4*	100	526.551	11/2$^-$				
1781.39	(11/2)$^+$	649.85 *4*	100 *6*	1131.512	7/2$^+$				
		1254.8 *10*	1.3 *7*	526.551	11/2$^-$				
1791.213	5/2$^+$	113.15[‡]	≈0.09	1678.065	(7/2)$^+$				
		247.5 *3*	0.37 *11*	1543.70	(1/2$^+$)				
		333.6 *2*	0.48 *4*	1457.566	5/2$^+$				
		342.52 *12*	0.011 *8*	1448.36	(3/2$^+$)				
		530.8 *4*	0.4 *2*	1260.416	5/2$^+$	(M1+E2)	−0.55 *20*	0.0091 *3*	α(K)=0.0079 *3*; α(L)=0.001018 *22*; α(M)=0.000206 *5*; α(N+..)=4.80×10^{-5} *11* α(N)=4.27×10^{-5} *9*; α(O)=5.31×10^{-6} *14*
		1502.79 *4*	13.9 *4*	288.455	1/2$^+$				
		1791.196 *21*	100.0 *4*	0.0	3/2$^+$				
1849.8?	(13/2$^-$)	1323.2[a] *4*	100	526.551	11/2$^-$				
1894.45	(7/2,9/2)	1367.89 *4*	100	526.551	11/2$^-$				
1927.294	(5/2$^+$,7/2$^+$)	361.85 *13*	63 *8*	1565.288	9/2$^+$				
		795.5 *4*	8 *8*	1131.512	7/2$^+$				
		1927.30 *3*	100 *4*	0.0	3/2$^+$				
1968.323	(9/2)$^+$	290.27 *4*	4.6 *3*	1678.065	(7/2)$^+$	[M1,E2]		0.0455 *13*	α(K)=0.0382 *6*; α(L)=0.0058 *9*; α(M)=0.00118 *19*; α(N+..)=0.00027 *4* α(N)=0.00024 *4*; α(O)=2.9×10^{-5} *3*
		403.03 *4*	3.48 *5*	1565.288	9/2$^+$				
		707.92 *4*	9.9 *5*	1260.416	5/2$^+$				
		836.804 *16*	100.0 *13*	1131.512	7/2$^+$	(M1+E2)	+3.58 *10*	0.00248	α(K)=0.00213 *3*; α(L)=0.000278 *4*;

$^{135}_{54}Xe_{81}$-4

Adopted Levels, Gammas (continued)

$\gamma(^{135}\mathrm{Xe})$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[#]	δ[@]	α[&]	Comments
									α(M)=5.64×10^{-5} *8*; α(N+..)=1.307×10^{-5} *19* α(N)=1.163×10^{-5} *17*; α(O)=1.436×10^{-6} *21*
1968.323	$(9/2)^+$	1441.8 *5*	0.26 *18*	526.551	$11/2^-$				
2045.892	$(5/2^+,7/2^+)$	254.74 *13*	2.6 *10*	1791.213	$5/2^+$				
		588.28 *6*	5.9 *17*	1457.566	$5/2^+$				
		785.48 *5*	17.4 *20*	1260.416	$5/2^+$	(M1+E2)	−0.56 *10*	0.00352 *8*	α(K)=0.00304 *7*; α(L)=0.000383 *8*; α(M)=7.75×10^{-5} *16*; α(N+..)=1.81×10^{-5} *4* α(N)=1.60×10^{-5} *4*; α(O)=2.01×10^{-6} *5*
		2045.88 *3*	100 *3*	0.0	$3/2^+$				
2048.55		1521.99 *13*	100	526.551	$11/2^-$				
2058.4	$(19/2^-)$	309.9 *4*	100	1748.5	$(15/2^-)$				
2092.943	$(7/2^-,9/2)$	165.74 *6*	2.42 *20*	1927.294	$(5/2^+,7/2^+)$				
		414.83 *3*	23.3 *12*	1678.065	$(7/2)^+$				
		961.43[‡]	11.3 *20*	1131.512	$7/2^+$				
		1566.41 *3*	100.0 *23*	526.551	$11/2^-$				
2112.4	$(5/2)^+$	2112.4 *5*	100	0.0	$3/2^+$				
2151.52		2151.5 *1*	100	0.0	$3/2^+$				
2168.9?	$(17/2^-)$	319.1[a] *6*	100	1849.8?	$(13/2^-)$				
2233.041	$(9/2^+)$	184.49 *8*	0.57 *6*	2048.55					
		305.83 *9*	2.31 *7*	1927.294	$(5/2^+,7/2^+)$				
		451.63 *3*	7.7 *4*	1781.39	$(11/2)^+$				
		972.62[‡]	29.4 *7*	1260.416	$5/2^+$				
		1101.58 *3*	39.2 *7*	1131.512	$7/2^+$	(M1+E2)	+1.82 *20*	0.00141 *3*	α(K)=0.001218 *23*; α(L)=0.000153 *3*; α(M)=3.10×10^{-5} *6*; α(N+..)=7.64×10^{-6} *14* α(N)=6.40×10^{-6} *12*; α(O)=7.99×10^{-7} *15*; α(IPF)=4.36×10^{-7} *7*
		1706.459 *21*	100 *3*	526.551	$11/2^-$				
2255.479	$(7/2^+)$	162.65 *11*	0.27 *8*	2092.943	$(7/2^-,9/2)$				
		690.13 *5*	3.6 *4*	1565.288	$9/2^+$				
		797.71 *8*	4.8 *8*	1457.566	$5/2^+$				
		807.2 *3*	1.3 *5*	1448.36	$(3/2^+)$				
		995.09 *10*	4.3 *8*	1260.416	$5/2^+$	(M1+E2)	−1.14 *30*	0.00187 *9*	α(K)=0.00161 *8*; α(L)=0.000203 *9*; α(M)=4.10×10^{-5} *17*; α(N+..)=9.6×10^{-6} *4* α(N)=8.5×10^{-6} *4*; α(O)=1.06×10^{-6} *5*
		1124.00 *3*	100.0 *8*	1131.512	$7/2^+$	(M1+E2)	−1.08 *20*	0.00144 *5*	α(K)=0.00124 *4*; α(L)=0.000155 *5*; α(M)=3.13×10^{-5} *9*; α(N+..)=8.23×10^{-6} *21* α(N)=6.48×10^{-6} *19*; α(O)=8.12×10^{-7} *24*; α(IPF)=9.35×10^{-7} *16*
		2255.457 *22*	17.0 *6*	0.0	$3/2^+$				
2356.5		298.1 *6*	100	2058.4	$(19/2^-)$				

From ENSDF

$^{135}_{54}\mathrm{Xe}_{81}$-5

Adopted Levels, Gammas (continued)

$\gamma(^{135}Xe)$ (continued)

E_i(level)	J_i^{π}	E_{γ}[†]	I_{γ}[†]	E_f	J_f^{π}
2357.24	(9/2$^+$)	264.26 9	31.7 5	2092.943	(7/2$^-$,9/2)
		429.93 3	52 4	1927.294	(5/2$^+$,7/2$^+$)
		575.97 8	22 4	1781.39	(11/2)$^+$
		679.22 15	9.4 25	1678.065	(7/2)$^+$
		1096.86 10	15.3 25	1260.416	5/2$^+$
		1225.6 3	7.4 30	1131.512	7/2$^+$
		1830.69 4	100 3	526.551	11/2$^-$
2371.99	7/2$^{(+)}$,9/2$^{(+)}$	1240.47 3	100 3	1131.512	7/2$^+$
		1845.3 4	0.6 3	526.551	11/2$^-$
2387.5?		218.5[a] 9	100	2168.9?	(17/2$^-$)
2408.66	(5/2,7/2$^+$)	616.9 2	4 2	1791.213	5/2$^+$
		960.29[‡]	4 3	1448.36	(3/2$^+$)
		2408.65 3	100 3	0.0	3/2$^+$
2447.30		656.09 10	100 20	1791.213	5/2$^+$
2447.30		1315.77 11	88 23	1131.512	7/2$^+$
2466.11	(7/2$^+$)	684.6 2	32 12	1781.39	(11/2)$^+$
		1334.8 2	44 12	1131.512	7/2$^+$
		2466.07 10	100 4	0.0	3/2$^+$
2475.08	(7/2$^-$,9/2)	1343.66 9	100 15	1131.512	7/2$^+$
		1948.49 5	81 8	526.551	11/2$^-$
2477.87?	(5/2)	2189.4[a] 2	100 20	288.455	1/2$^+$
		2477.1[a] 4	11.1 23	0.0	3/2$^+$
2570.7		512.3 6	100	2058.4	(19/2$^-$)
2710.6?		323.1[a] 9	100 33	2387.5?	
		541.8[a] 9	<33	2168.9?	(17/2$^-$)
3169.9		599.2 6	100 30	2570.7	
		813.4 9	75 20	2356.5	

[†] From either ^{135}I β^- decay or ^{208}Pb(^{18}O,Fγ). Most levels are populated independently in the two datasets, low spins in β^- decay and high spins in (^{18}O,Fγ).

[‡] Component of a doublet, Eγ from level-energy difference. The γ-ray intensities are divided.

[#] From ce data and/or $\gamma\gamma(\theta)$ in ^{135}I β^-. Large δ(Q/D) in $\gamma\gamma(\theta)$ and $\Delta\pi$ implies M1+E2.

[@] From $\gamma\gamma(\theta)$ in ^{135}I β^- decay.

[&] 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.

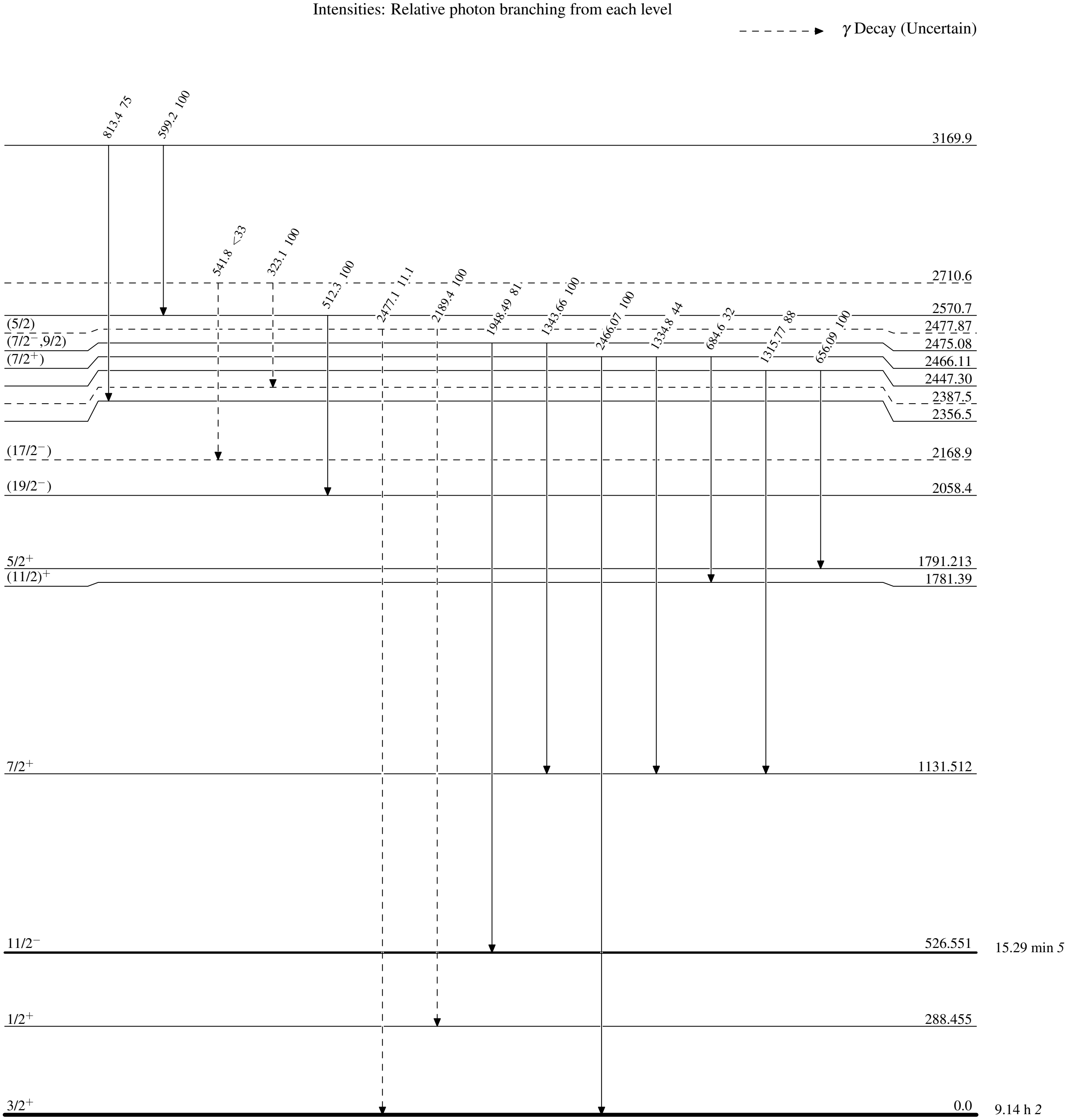
[a] Placement of transition in the level scheme is uncertain.

$^{135}_{54}Xe_{81}$-6

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{135}_{54}Xe_{81}$

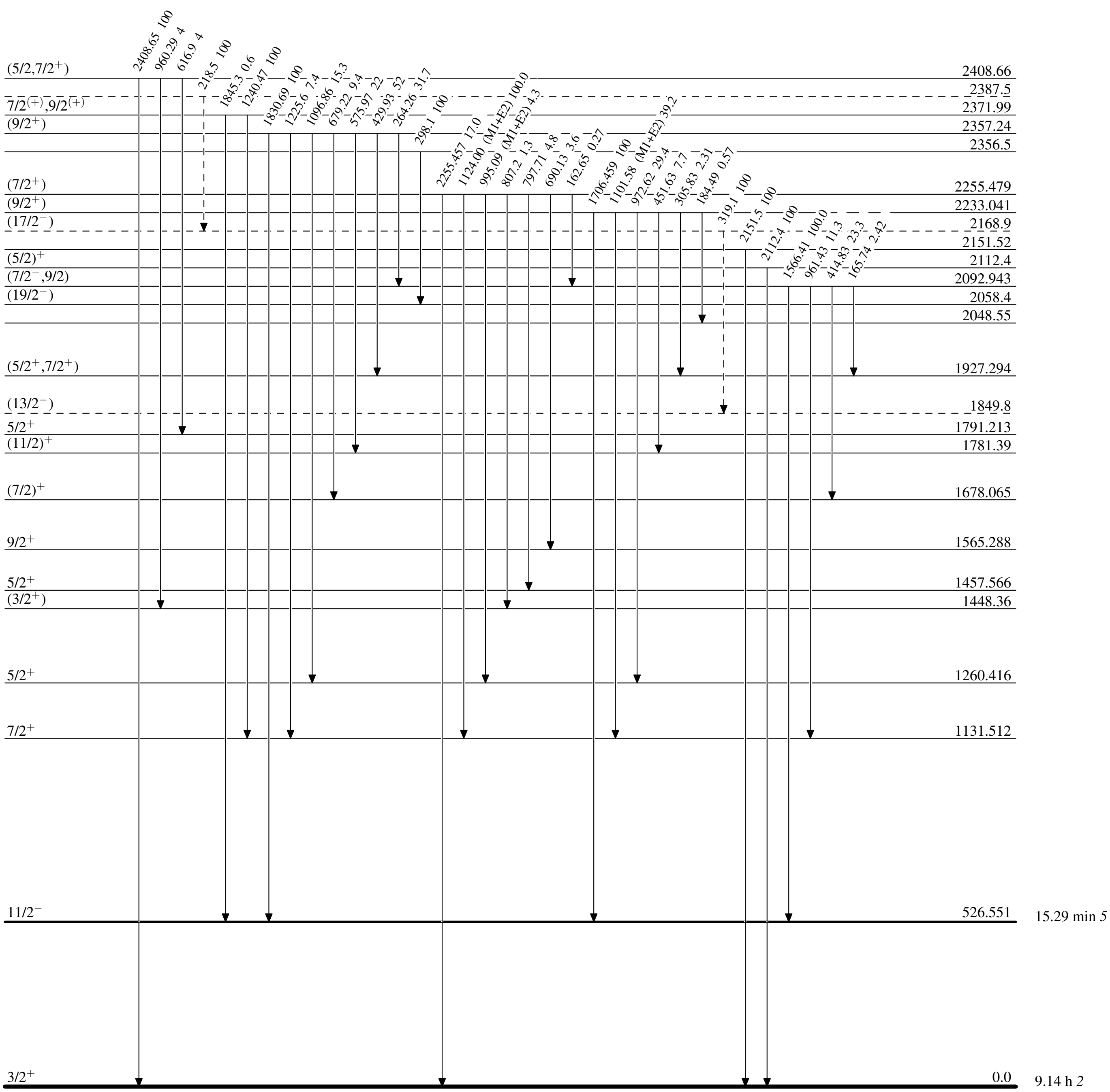
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{135}_{54}Xe_{81}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

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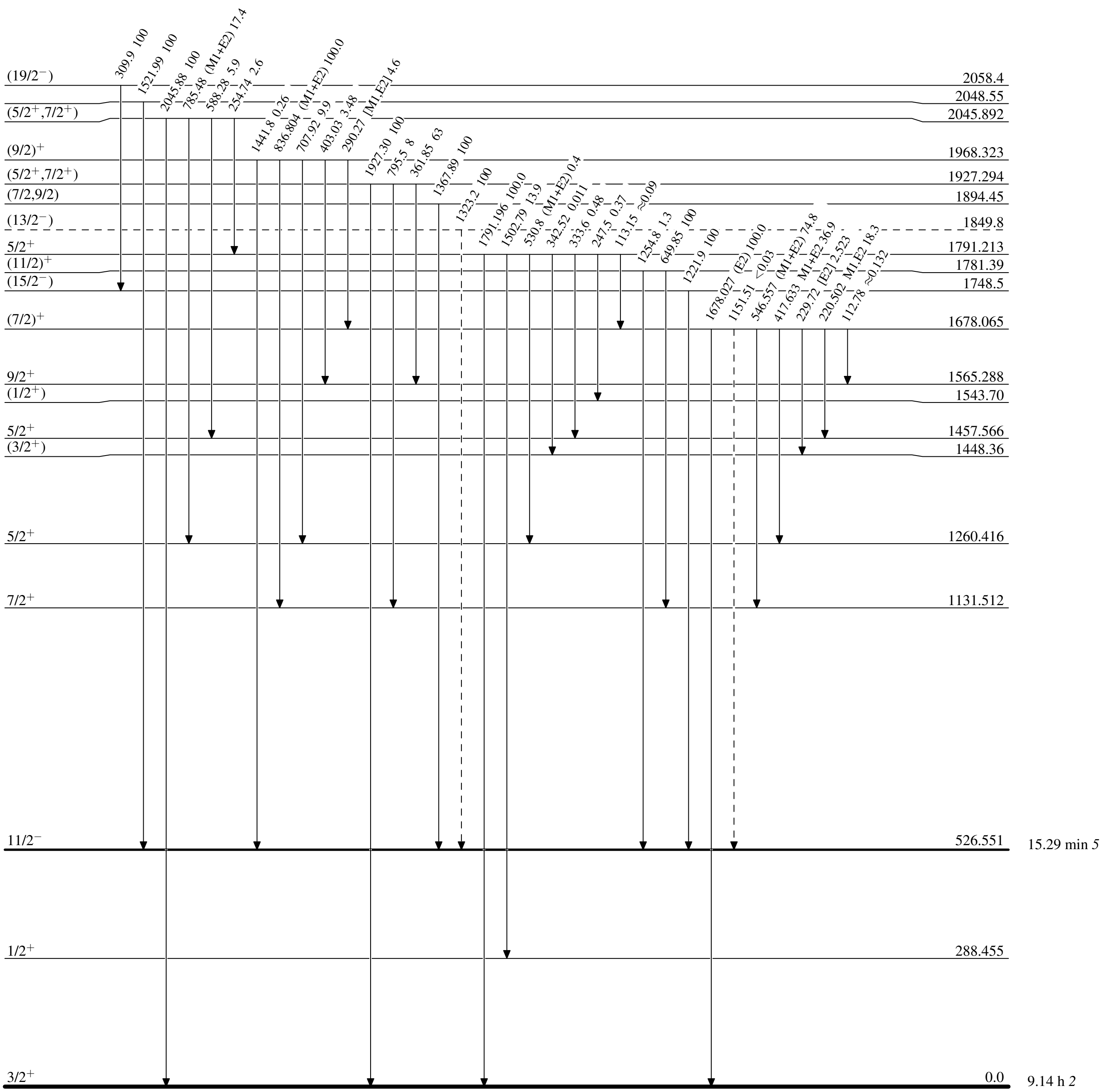
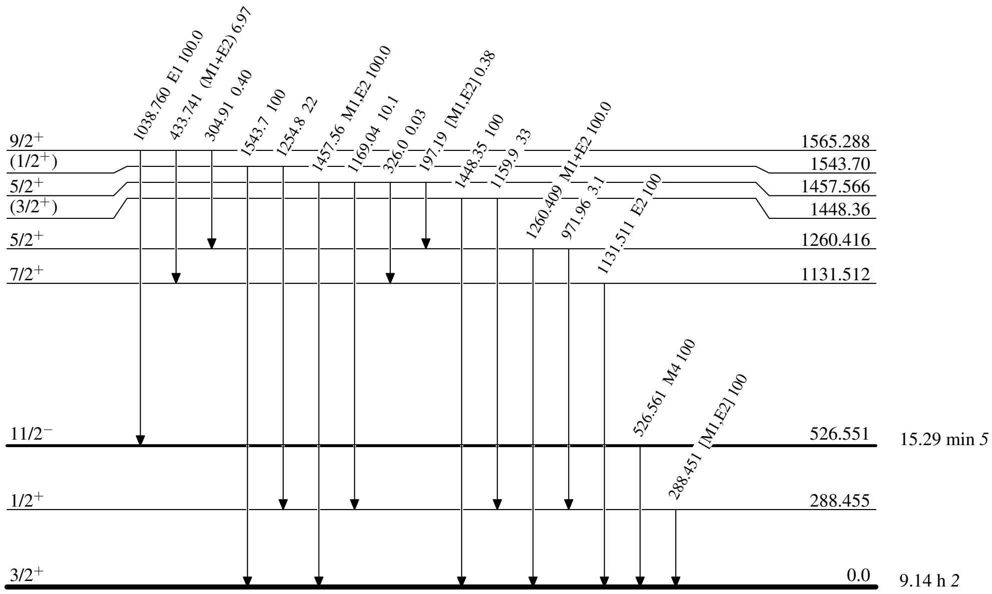


$^{135}_{54}Xe_{81}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{135}_{54}Xe_{81}$