Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 93,33 (2001)	11-May-2001

Q(β^-)=362 *9*; S(n)=7472 *10*; S(p)=5493 *9*; Q(α)=−1413 *10* 2012Wa38
Note: Current evaluation has used the following Q record 369 11 *7473* 10 *5494* 8 −1413 9 1995Au04.
Mass measurement: 1999Am05, 1990St25.
Isotope shifts, $\Delta<r^2>$: 1987Al25, 1978Hu08.

^{130}Cs Levels

Additional information 1.

Cross Reference (XREF) Flags

A	^{130}Cs IT decay (3.46 min)
B	^{124}Sn(^{10}B,4nγ),^{128}Te(^{6}Li,4nγ)
C	^{127}I(α,nγ)
D	^{129}Xe(^{3}He,d)

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	1$^+$	29.21 min *4*	ABCD	%β^-=1.6; %ε+%β^+=98.4 μ=+1.460 *7* (1989Ra17,1981Th06) Q=−0.059 *6* (1989Ra17,1981Th06) %β^+: from Iβ^+/Iβ^-=27.6 (1952Sm41) and theoretical ε/β^+ (1971Go40). μ,Q: from LASER spectroscopy (1981Th06). Other: μ=+1.466 *15* from atomic beam (1977Ek02,1978Ek05). J$^\pi$: atomic beam (1956Ni16,1958Ni27); L(^{3}He,d)=2(+0) from 1/2$^+$. T$_{1/2}$: from 1981Ha09. Others: 29.11 min *12* (1967Wa11), 29.9 min *1* (1968Fe06), 1966Gf01, 1952Sm41, 1950Fi16.
80.37 *7*	2$^+$		ABC	J$^\pi$: ΔJ=1, M1 γ to 1$^+$; E3 γ from 5$^-$.
131.54 *6*	2$^+$		ABCD	J$^\pi$: M1 γ's to 1$^+$ and 2$^+$; γ from 5$^-$.
148.35 *7*	2$^-$		ABC	J$^\pi$: ΔJ=1, E1 γ to 1$^+$; γ from 5$^-$.
163.25 *11*	5$^-$	3.46 min *6*	ABC	%IT=99.84 *2*; %ε+%β^+=0.16 *2* μ=+0.629 *4* (1989Ra17,1981Th06) Q=+1.45 *5* (1989Ra17,1981Th06) μ,Q: from LASER spectroscopy (1981Th06). Other: μ=0.631 *10* from atomic beam (1977Ek02). T$_{1/2}$: from 1983We07. Other: 3.7 min (1977Ek02). J$^\pi$: LASER spectroscopy (1981Th06), atomic beam (1977Ek02,1978Ek05); E3-M1 cascade to 1$^+$.
170.49 *8*	(≤3)		BC	J$^\pi$: γ's to 1$^+$ and 2$^+$.
253.87 *10*	(≤4)		BC	J$^\pi$: γ to 2$^+$.
270.20 *11*	(1$^+$,3$^+$)		BC	J$^\pi$: ΔJ=1, (M1+E2) γ to 2$^+$.
278.80 *10*	(6)$^-$		BC	J$^\pi$: ΔJ=1, M1+E2 γ to 5$^-$.
314.52 *11*	(1,3)		BC	J$^\pi$: ΔJ=(1) γ to 2$^+$.
318.1 *1*			C	
375.60& *15*	(7)$^-$		BC	J$^\pi$: ΔJ=1, M1(+E2) γ to (6)$^-$.
432.13 *14*	(1 to 4)		BC	J$^\pi$: γ's to 2$^+$ and (3).
530.2 *4*			BC	J$^\pi$: γ to (1$^+$,3$^+$).
535.0 *4*			C	
565.50@ *17*	(8$^-$)		B	J$^\pi$: ΔJ=(1), (M1+E2) γ to (7)$^-$.
618.12& *24*	(8)$^-$		B	J$^\pi$: ΔJ=1, M1+E2 γ to (7)$^-$.
638.2 *3*			C	J$^\pi$: γ to (1$^+$,3$^+$).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{130}Cs Levels (continued)

E(level)†	J^π	XREF	Comments
688.35 *21*		BC	J^π: γ to $(1^+,3^+)$.
878.26@ *25*	(9^-)	BC	J^π: $\Delta J=1$, M1+E2 γ to (8^-).
954.3 *4*		BC	
962.1 *4*		BC	
974.8‡ *4*	(9^+)	BC	J^π: $\Delta J=1$, E1 γ to (8^-).
997.25& *23*	(9^-)	BC	J^π: $\Delta J=(2)$ γ to $(7)^-$; $\Delta J=1$ γ to $(8)^-$.
1050.4 *4*		C	
1126.5‡ *4*	(10^+)	BC	J^π: $\Delta J=1$, M1(+E2) γ to (9^+).
1172.1@ *3*	(10^-)	BC	J^π: $\Delta J=1$, M1+E2 γ to (9^-); $\Delta J=2$ γ to (8^-).
1242.9 *4*		BC	
1265.4& *3*	(10^-)	B	J^π: $\Delta J=2$ γ to $(8)^-$.
1479.8‡ *5*	(11^+)	B	J^π: $\Delta J=1$, M1+E2 γ to (10^+).
1512.9@ *4*	(11^-)	B	J^π: $\Delta J=2$ γ to (9^-).
1673.8#	(11^+)	B	
1770.0‡ *5*	(12^+)	B	J^π: $\Delta J=1$, M1+E2 γ to (11^+); γ to (10^+).
1805.6& *4*		B	J^π: γ to (9^-).
1960.7@ *4*	(12^-)	B	J^π: $\Delta J=(2)$ γ to (10^-).
2074.8#	(12^+)	B	
2086.1& *4*	(12^-)	B	J^π: γ to (10^-).
2187.0‡ *5*	(13^+)	B	J^π: γ's to (11^+) and (12^+).
2309.6@ *5*		B	J^π: γ to (11^-).
2446.8#	(13^+)	B	
2613.5‡ *6*	(14^+)	B	J^π: $\Delta J=1$ γ to (13^+).
2796.6# *6*	(14^+)	B	J^π: γ to (13^+).
2897.6@ *5*		B	J^π: γ to (12^-).
3082.5‡	(15^+)	B	
3249.8#	(15^+)	B	
3547.5‡	(16^+)	B	
4040.5‡	(17^+)	B	

† For levels built on the 5^- isomer at 163.2, 1991Sa25 assume that the 97-115 cascade feeds this isomer directly, although they cannot rule out the possibility of an undetected low-energy transition at the bottom of this cascade.

‡ Band(A): $\Delta J=1$ band based on 9^+. Possible configuration=$\nu h_{11/2}\pi h_{11/2}$. See also comment for the band based on (11^+).

Band(a): $\Delta J=1$ band based on (11^+). This band is assigned (2001St04) as the sideband partner (chiral doublet structure) of $\nu h_{11/2}\pi h_{11/2}$ configuration. Similar doublet bands are found (2001St04,2001He15) in ^{132}La, ^{134}Pr, ^{136}Pm and ^{138}Eu.

@ Band(B): $\Delta J=1$ band based on (8^-). Possible configuration=$\nu h_{11/2}\pi d_{5/2}$.

& Band(C): $\Delta J=1$ band based on (7^-). Possible configuration=$\nu h_{11/2}\pi g_{7/2}$.

Adopted Levels, Gammas (continued)

$\gamma(^{130}Cs)$

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	δ ‡	α @	Comments
80.37	2^+	80.45 *10*	100	0.0	1^+	M1		1.703	α(K)= 1.459; α(L)= 0.1941; α(M)= 0.0395; α(N+..)=0.01036
131.54	2^+	51.18 *5*	100 *5*	80.37	2^+	M1		6.34	α(K)= 5.43; α(L)= 0.726; α(M)= 0.1481; α(N+..)= 0.0387
		131.50 *7*	18.4 *15*	0.0	1^+	M1		0.420	α(K)= 0.360; α(L)= 0.0477; α(M)=0.00971; α(N+..)=0.00255
148.35	2^-	148.35 *7*	100	0.0	1^+	E1		0.0734	α(K)= 0.0631; α(L)=0.00822; α(M)=0.00166; α(N+..)=0.00042
163.25	5^-	14.9 *3*	0.00038# *6*	148.35	2^-	[M3]		2.2×10^6 *3*	α(L)=1.635×10^6; α(M)= 4.26×10^5 B(M3)(W.u.)=0.075 *4*
		31.5 *3*	0.54# *6*	131.54	2^+	[E3]		1.50×10^4 *9*	α(L)=1.141×10^4; α(M)= 2.73×10^3 B(E3)(W.u.)=0.0068 *4*
		82.9 *1*	100 *6*	80.37	2^+	E3		59.4	α(K)= 11.43; α(L)= 37.4; α(M)= 8.45; α(N+..)= 2.136 B(E3)(W.u.)=0.00145 *9*
170.49	(≤3)	90.2 *1*	<83	80.37	2^+				
		170.5 *1*	100 *20*	0.0	1^+				
253.87	(≤4)	83.4 *1*		170.49	(≤3)				
		173.5 *1*	100 *20*	80.37	2^+				
270.20	$(1^+,3^+)$	138.8 *1*	100 *20*	131.54	2^+				A_2=−0.28 *6*.
		189.9& *1*	<344	80.37	2^+	(M1+E2)	−0.06 *2*		
278.80	$(6)^-$	115.6 *1*	100	163.25	5^-	M1+E2	−0.06 *2*		
314.52	(1,3)	44.3 *1*	<36	270.20	$(1^+,3^+)$				
		60.6 *1*	<36	253.87	(≤4)				
		183.2 *1*	100 *20*	131.54	2^+				
318.1		147.6 *1*	100	170.49	(≤3)				
375.60	$(7)^-$	96.8 *1*	100	278.80	$(6)^-$	M1(+E2)	−0.02 *2*		
432.13	(1 to 4)	117.6 *1*	88 *18*	314.52	(1,3)				
		300.9 *3*	100 *20*	131.54	2^+				
530.2		260.0& *3*	100	270.20	$(1^+,3^+)$				
535.0		216.9 *3*	100	318.1					
565.50	(8^-)	189.9& *1*	100	375.60	$(7)^-$	(M1+E2)	−0.06 *2*		
618.12	$(8)^-$	242.5 *3*	100	375.60	$(7)^-$	M1+E2	−0.09 *2*		
638.2		368.1 *3*		270.20	$(1^+,3^+)$				
688.35		256.3 *3*	<125	432.13	(1 to 4)				
		373.8 *3*	<125	314.52	(1,3)				
		418.1 *3*	100 *20*	270.20	$(1^+,3^+)$				
878.26	(9^-)	260.0& *3*	<57	618.12	$(8)^-$				
		312.6 *3*	100 *20*	565.50	(8^-)	M1+E2	−0.18 *3*		
954.3		522.2 *3*	100	432.13	(1 to 4)				

Adopted Levels, Gammas (continued)

γ(^{130}Cs) (continued)

E_i(level)	J^{π}_i	E_γ†	I_γ†	E_f	J^{π}_f	Mult.‡	δ‡
962.1		530.0 *3*	100	432.13	(1 to 4)		
974.8	(9$^+$)	409.3 *3*	100	565.50	(8$^-$)	E1	
997.25	(9$^-$)	379.2 *3*	100 *20*	618.12	(8)$^-$	D+Q	−0.28 *6*
		431.9 *3*	<100	565.50	(8$^-$)		
		621.7 *3*	<100	375.60	(7)$^-$	(Q)	
1050.4		618.2 *3*	100	432.13	(1 to 4)		
1126.5	(10$^+$)	151.7 *1*	100	974.8	(9$^+$)	M1(+E2)	−0.03 *3*
1172.1	(10$^-$)	293.9 *3*	<36	878.26	(9$^-$)	M1+E2	−0.2 *1*
		606.6 *3*	100 *20*	565.50	(8$^-$)	Q	
1242.9		554.6 *3*	100	688.35			
1265.4	(10$^-$)	268.4 *3*	<71	997.25	(9$^-$)		
		386.8 *3*	<71	878.26	(9$^-$)		
		647.3 *3*	100 *20*	618.12	(8)$^-$	Q	
1479.8	(11$^+$)	353.4 *3*	100	1126.5	(10$^+$)	M1+E2	+0.03 *2*
1512.9	(11$^-$)	340.8 *3*	<83	1172.1	(10$^-$)		
		634.7 *3*	100 *20*	878.26	(9$^-$)	Q	
1673.8	(11$^+$)	547		1126.5	(10$^+$)		
		699		974.8	(9$^+$)		
1770.0	(12$^+$)	290.3 *3*	100 *20*	1479.8	(11$^+$)	M1+E2	−0.11 *3*
		643.4 *3*	69 *14*	1126.5	(10$^+$)		
1805.6		808.3 *3*		997.25	(9$^-$)		
1960.7	(12$^-$)	788.6 *3*	100	1172.1	(10$^-$)	(Q)	
2074.8	(12$^+$)	401		1673.8	(11$^+$)		
		595		1479.8	(11$^+$)		
2086.1	(12$^-$)	820.7 *3*	100	1265.4	(10$^-$)		
2187.0	(13$^+$)	416.9 *3*	100 *20*	1770.0	(12$^+$)		
		707.2 *3*	86 *17*	1479.8	(11$^+$)		
2309.6		796.6 *3*	100	1512.9	(11$^-$)		
2446.8	(13$^+$)	372		2074.8	(12$^+$)		
		677		1770.0	(12$^+$)		
		773		1673.8	(11$^+$)		
2613.5	(14$^+$)	426.5 *3*		2187.0	(13$^+$)	D+Q	−0.07 *5*
		843		1770.0	(12$^+$)		
2796.6	(14$^+$)	350		2446.8	(13$^+$)		
		609.6 *3*		2187.0	(13$^+$)		
		722[a]		2074.8	(12$^+$)		
2897.6		936.9 *3*		1960.7	(12$^-$)		
3082.5	(15$^+$)	469		2613.5	(14$^+$)		
		895		2187.0	(13$^+$)		
3249.8	(15$^+$)	453		2796.6	(14$^+$)		
		803		2446.8	(13$^+$)		
3547.5	(16$^+$)	934		2613.5	(14$^+$)		

$\gamma(^{130}Cs)$ (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π
4040.5	(17^+)	493[a]	3547.5	(16^+)
		958	3082.5	(15^+)

[†] From IT decay for gammas from levels below 165. From $(^{10}B,4n\gamma)$,$(^{6}Li,4n\gamma)$ if a level is populated in both the in-beam reactions.

[‡] From ^{130}Cs IT decay for gammas from levels up to 163. For gammas from higher levels, the assignments are from $(^{10}B,4n\gamma)$,$^{128}Te(^{6}Li,4n\gamma)$.

[#] From I(γ+ce) and α in ^{130}Cs IT 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.

[&] Multiply placed.

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

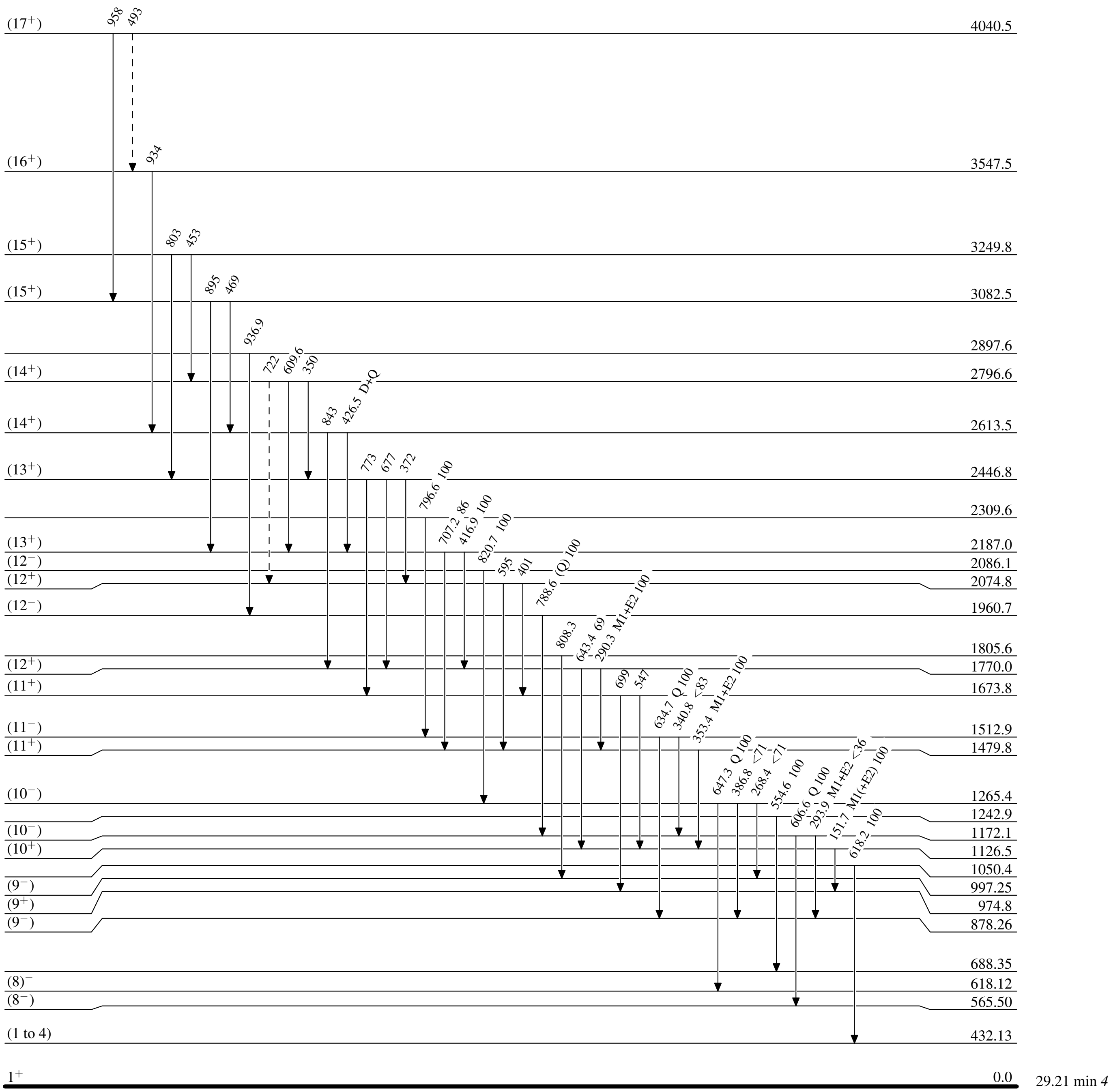
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

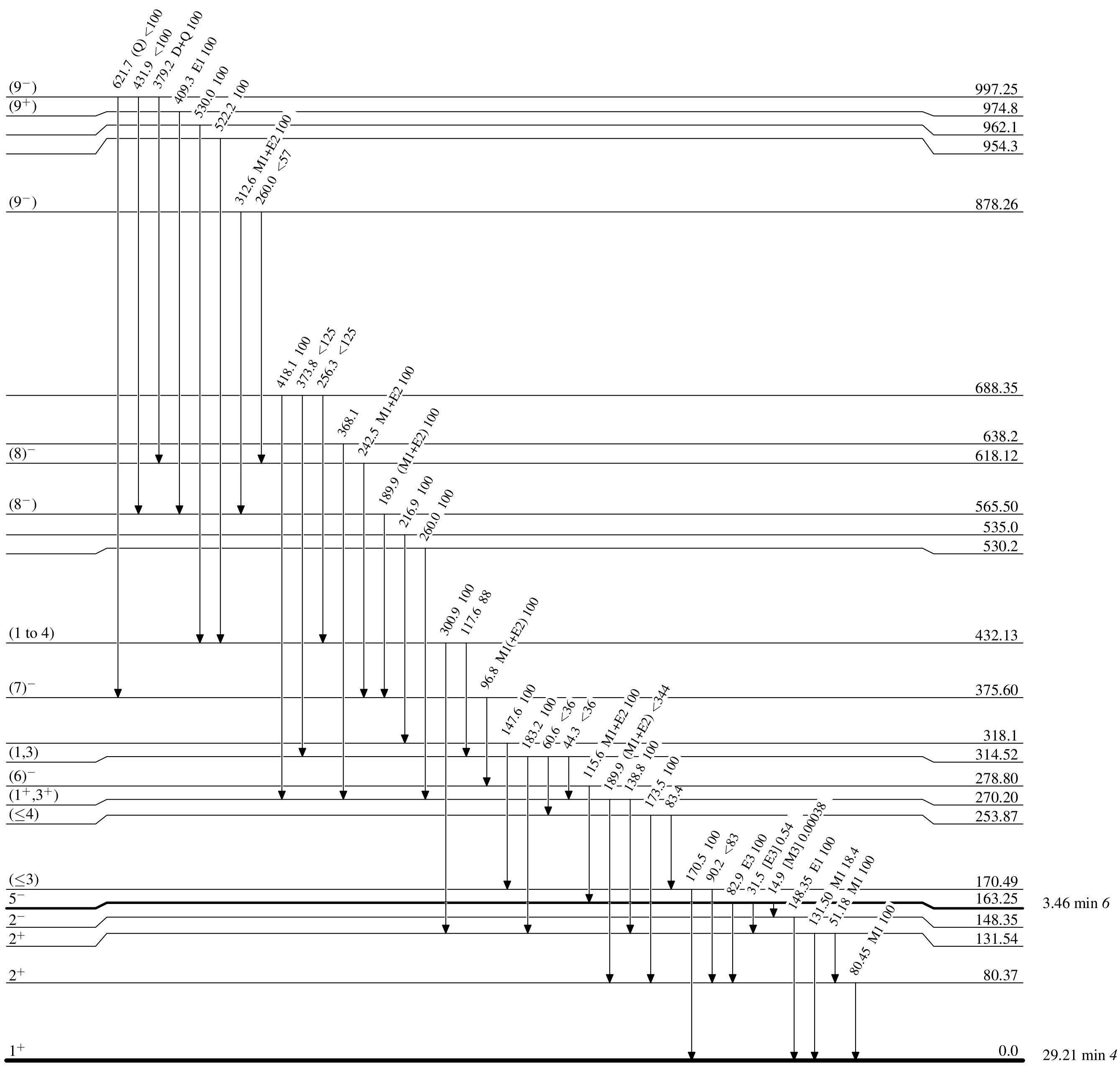


$^{130}_{55}Cs_{75}$

Adopted Levels, Gammas

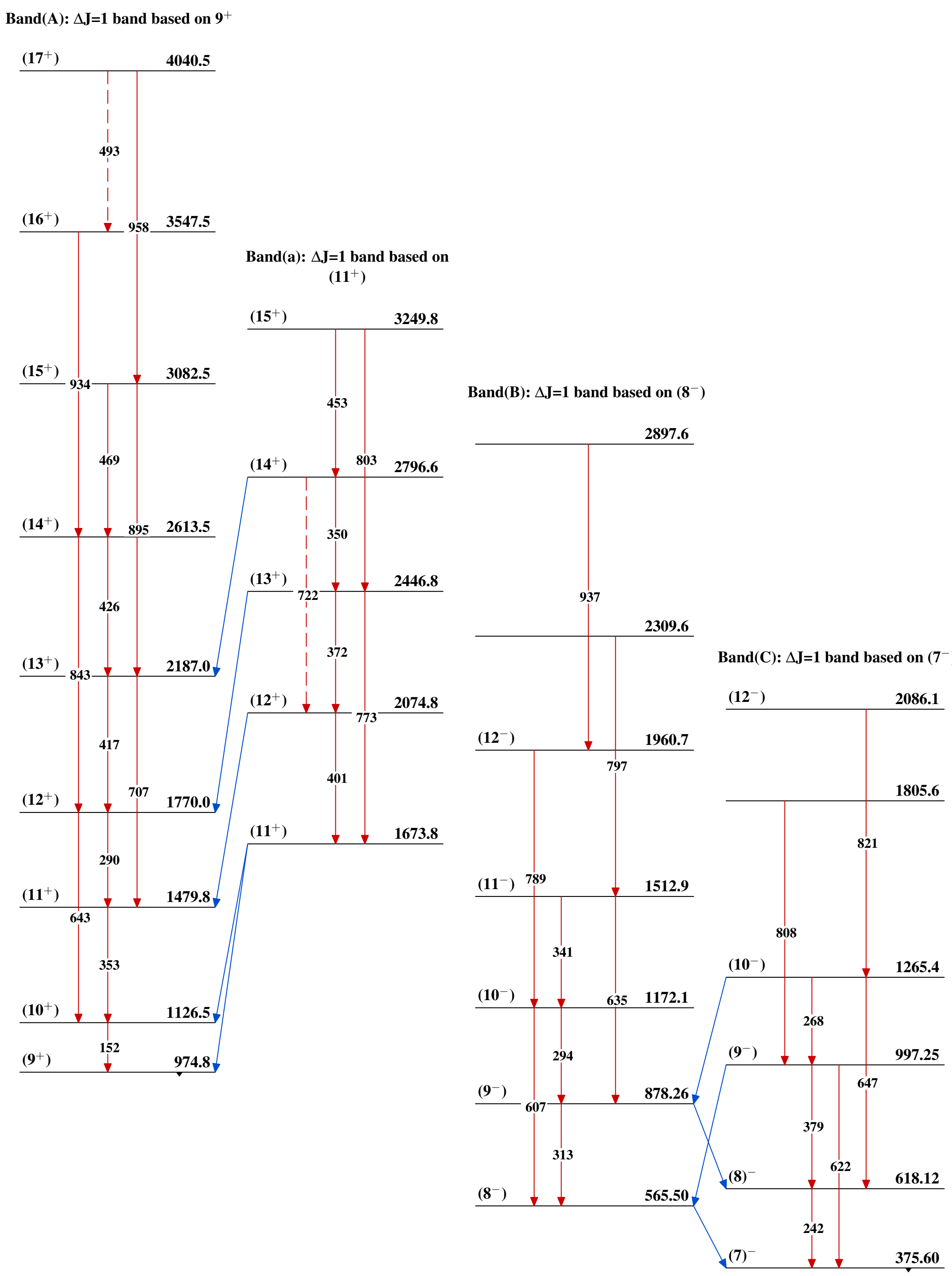
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{130}_{55}Cs_{75}$

Adopted Levels, Gammas



$^{130}_{55}Cs_{75}$