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^-)=268.9 *11*; S(n)=8762.0 *10*; S(p)=6746.5 *13*; Q(α)=−2563.9 *12* 2012Wa38
Note: Current evaluation has used the following Q record 268.7 11 *8762.0 10* 6746.3 *13*−2562.4 *15* 2003Au03.
Isotope shift measurements: 1986Bo45, 1986Ba59, 1978Ge15, 1975Ul02, 1967Hu01.
Additional information 1.
Mass measurements: 1999Am05 (penning trap), 1990St25, 1982Au01.
Nuclear structure calculations: 2005Si05 and 2000Pa61 (charge radii, isotope shifts), 1977Ok04 (low-lying collective states), 1971Ch12 and 1969Fr17 (levels, transition rates, magnetic moment, Q, unified model).
^{128}Te(^{14}N,n2pα) E=64-90 MeV: 2005Un01: measured excitation functions.

^{135}Cs Levels

Cross Reference (XREF) Flags

A ^{135}Xe β^- decay (9.14 h)
B ^{135}Xe β^- decay (15.29 min)
C ^{135}Cs IT decay (53 min)
D ^{134}Cs(n,γ) E=th
E ^{138}Ba(μ^-,3nγ)

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	7/2$^+$	2.3×10^6 y *3*	ABCDE	%β^-=100 μ=+2.7324 *2* (1989Ra17,1957St11) Q=+0.050 *2* (1989Ra17,1975Ac01) (<r^2>)$^{1/2}$=4.807 fm *5* (2004An14, evaluation). Additional information 2. μ: from atomic beam magnetic resonance (1957St11). Others: +2.73 *1* (from atomic-beam laser spectroscopy,1981Th06), 1949Da01. See also 2005St24 compilation. Q: from optical-double resonance, optical level crossing (1975Ac01,1972Ry03,1969Sv01). Others: Q=+0.03 *2* (from atomic-beam laser spectroscopy,1981Th06), 1959Bu93. See also 2005St24 compilation. J$^\pi$: spin from atomic beam (1949Da01) and LASER spectroscopy (1981Th06). Parity from systematics of odd-Cs nuclides based on the following considerations: 7/2$^+$ for ^{137}Cs is experimentally well established; g.s. spin of 7/2 for ^{133}Cs, ^{135}Cs and ^{137}Cs is known from atomic-beam experiments; measured g factors for the ground states of the above Cs nuclides are very similar. These arguments suggest similar (shell-model) structure namely g$_{7/2}$ orbital. The Nilsson model diagram for Z=55 protons suggest g$_{7/2}$ or d$_{5/2}$ orbitals for moderate deformations. These systematics arguments strongly suggest positive parity for ^{135}Cs g.s.. T$_{1/2}$: weighted average of 2.1×10^6 y *7* (1949Su03), 2.95×10^6 y *30* (1950Ze55), 2.0×10^6 y *2* (1955Pa53).
249.767 *4*	5/2$^+$	0.28 ns *8*	A DE	J$^\pi$: M1(+E2) γ to 7/2$^+$; log *ft*=5.9 from 3/2$^+$. T$_{1/2}$: from βce(t) in ^{135}Xe β^- decay (9.14 h).
408.026 *5*			A D	
608.153 *8*	5/2$^+$		A D	J$^\pi$: M1(+E2) γ to 7/2$^+$; log *ft*=6.7 from 3/2$^+$.
786.838 *13*	11/2$^+$		BCD	J$^\pi$: E2 γ to 7/2$^+$; γ from 19/2$^-$.
981.396 *19*			A D	
1062.385 *13*			A D	
1133?			B	
1192?			B	
1358?			B	
1632.9	19/2$^-$	53 min *2*	C	%IT=100

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Adopted Levels, Gammas (continued)

^{135}Cs Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				μ=+2.18 *1* (1989Ra17,1981Th06) Q=+0.89 *7* (1989Ra17,1981Th06) μ,Q: from atomic beam laser spectroscopy (1981Th06). See also 2005St24 compilation and analysis by 2006Ga46. J^π: spin from atomic beam (1977Ek02,1978Ek05) and LASER spectroscopy (1981Th06). Parity from M4-E2 cascade to $7/2^+$ g.s. $T_{1/2}$: from weighted average of 53 min *2* (1962Wa22) and 53 min *3* (1964Ha18). Other: 1982Bu07.

[†] From least-squares fit to Eγ's. Seven neutron resonances at E(n)= 0.01225, 0.03915, 0.05720, 0.1068, 0.1533, 0.170 and 0.263 keV are listed in the dataset: ^{134}Cs(n,γ):resonances.

γ(^{135}Cs)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ	α[a]	Comments
249.767	$5/2^+$	249.770 *4*	100	0.0	$7/2^+$	M1(+E2)	<1.0	0.0738 *21*	B(M1)(W.u.)=0.0023 *7*; B(E2)(W.u.)=23 *7* α(K)=0.0623 *10*; α(L)=0.0091 *11*; α(M)=0.00188 *23*; α(N+..)=0.00045 *5* α(N)=0.00039 *5*; α(O)=5.3×10^{-5} *5*; α(P)=2.34×10^{-6} *9*
408.026		158.260 *4*	81 *3*	249.767	$5/2^+$				
		408.009 *8*	100 *3*	0.0	$7/2^+$				
608.153	$5/2^+$	200.19[&] *10*	0.40 *16*	408.026					
		358.384 *9*	7.6 *3*	249.767	$5/2^+$	M1,E2		0.0265 *17*	α(K)=0.0224 *18*; α(L)=0.00325 *15*; α(M)=0.00067 *4*; α(N+..)=0.000160 *7* α(N)=0.000141 *7*; α(O)=1.90×10^{-5} *4*; α(P)=8.3×10^{-7} *11*
		608.151 *12*	100 *3*	0.0	$7/2^+$	M1(+E2)	<0.5	0.00730 *22*	α(K)=0.00629 *20*; α(L)=0.000803 *19*; α(M)=0.000164 *4*; α(N+..)=3.97×10^{-5} *10* α(N)=3.47×10^{-5} *9*; α(O)=4.84×10^{-6} *13*; α(P)=2.41×10^{-7} *9*
786.838	$11/2^+$	786.836 *13*	100	0.0	$7/2^+$	E2		0.00295	α(K)=0.00252 *4*; α(L)=0.000339 *5*; α(M)=6.93×10^{-5} *10*; α(N+..)=1.668×10^{-5} *24* α(N)=1.458×10^{-5} *21*; α(O)=2.00×10^{-6} *3*; α(P)=9.29×10^{-8} *13* Mult.: from ^{135}Cs IT decay.
981.396		373.13[&] *10*	28 *5*	608.153	$5/2^+$				γ reported in ^{135}Xe β^- decay only.
		573.36 *4*	8.7 *13*	408.026					
		731.634 *21*	100 *5*	249.767	$5/2^+$				

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Adopted Levels, Gammas (continued)

γ(^{135}Cs) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	α[a]	Comments
1062.385		454.2[&] *2*	5.1 *10*	608.153	5/2$^+$			
		654.296 *23*	64 *3*	408.026				
		812.635 *22*	100 *3*	249.767	5/2$^+$			
		1062.41[&] *2*	5.8 *12*	0.0	7/2$^+$			
1133?		1133[@b]	100[@]	0.0	7/2$^+$			
1192?		1192.2[@b]	100[@]	0.0	7/2$^+$			
1358?		1358[@b]	100[@]	0.0	7/2$^+$			
1632.9	19/2$^-$	846.1	100	786.838	11/2$^+$	M4	0.0421	B(M4)(W.u.)=0.0158 *7* α(K)=0.0350 *5*; α(L)=0.00565 *8*; α(M)=0.001185 *17*; α(N+..)=0.000286 *4* α(N)=0.000250 *4*; α(O)=3.42×10^{-5} *5*; α(P)=1.558×10^{-6} *22* E_γ,Mult.: from ^{135}Cs IT decay.

[†] From ^{134}Cs(n,γ), except as noted.
[‡] Relative photon branchings from ^{135}Xe β^- decay (9.14 h), unless otherwise stated.
[#] From ce data in ^{135}Xe β^- decay (9.14 h), unless otherwise stated.
[@] From ^{135}Xe β^- decay (15.29 min).
[&] From ^{135}Xe β^- decay (9.14 h).
[a] 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.
[b] Placement of transition in the level scheme is uncertain.

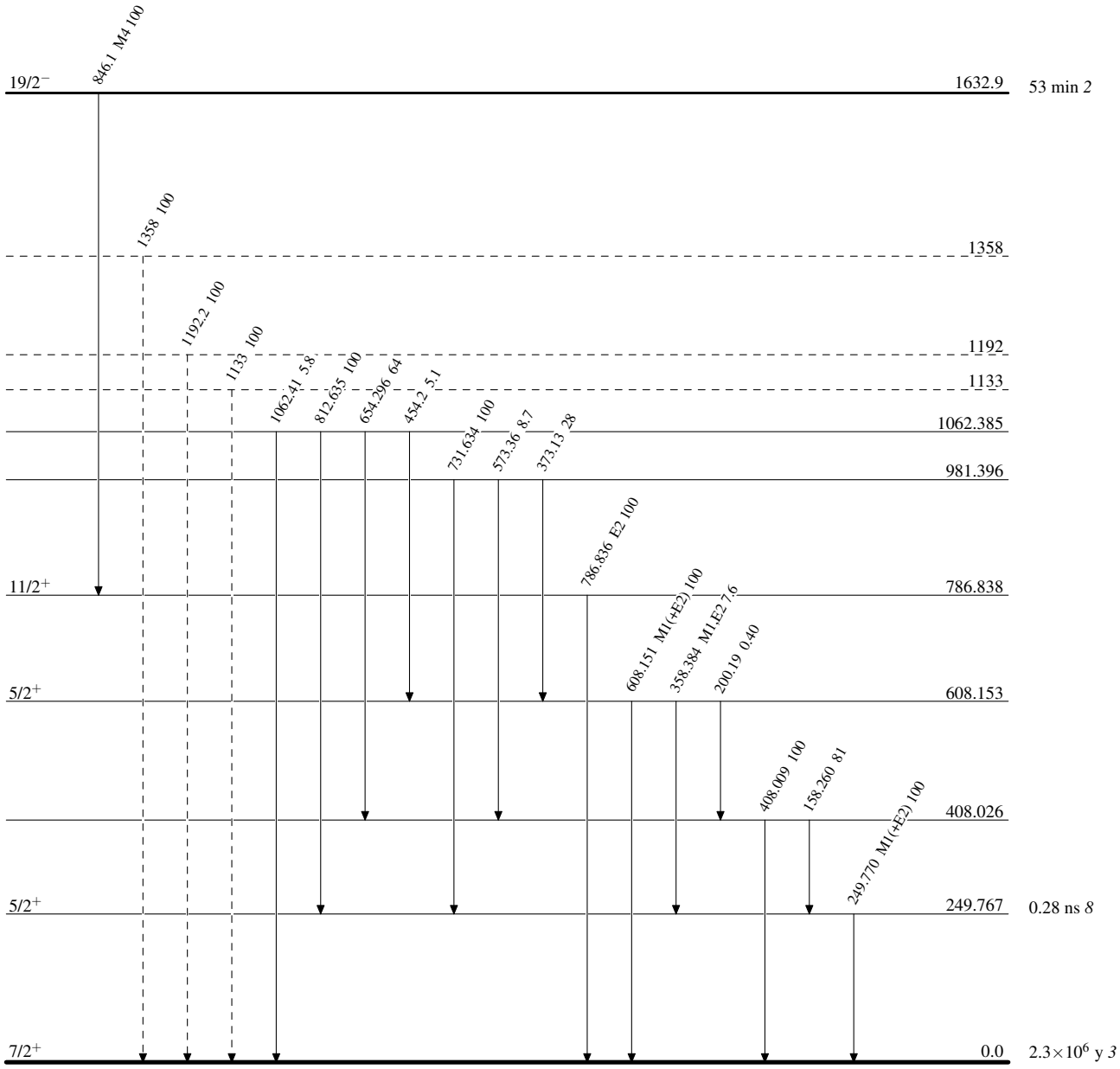
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{135}_{55}Cs_{80}$