

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

Q(β⁻)=-10060 SY; S(n)=10480 SY; S(p)=3030 SY; Q(α)=1880 SY 2021Wa16

ΔQ(β⁻)=500, ΔS(n)=500, ΔS(p)=420, ΔQ(α)=360 (syst,2021Wa16).

S(2n)=23740 500, S(2p)=4120 330, Q(εp)=7030 300 (syst,2021Wa16).

Mass measurement: 2017At01.

Other measurements:

1984Ni03 (also 1988WiZN): ¹²³Ce produced and identified in ⁹²Mo(³⁶Ar,αn) reaction at E=196 MeV, β-delayed proton; the delayed protons feed the ground-state band 0⁺, 2⁺, 4⁺, 6⁺ members of ¹²²Ba.

1988GeZR: ¹²³Ce produced in ⁹²Mo(³⁶Ar,X), E=170-210 MeV; measured E_γ, I_γ. Possible 66-, 113-, 178-keV γ rays from the decay of ¹²³Ce to ¹²³La. Half-life of 3.8 s from 1984Ni03 was checked for only the 113γ.

Additional information 1.

Structure calculations: 2018Se02, 2017Se19, 2016Na19, 2015EI05, 2013Ku12, 2012Qi01, 2011Sh13, 2010Af01, 2002Du01, 2002Sa20, 1995Sh16.

¹²³Ce Levels

Cross Reference (XREF) Flags

A ⁶⁴Zn(⁶⁴Zn,αnγ)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0	(5/2)	3.8 s 2		%ε+%β ⁺ =100; %εp>0. J ^π : from a comparison of proton decay to 2 ⁺ , 4 ⁺ and possibly 6 ⁺ rotational levels in ¹²² Ba with calculated branchings (1984Ni03). T _{1/2} : from weighted average of 3.9 s 2 from delayed decay of protons and 3.3 s 6 from decay of La x-ray (1984Ni03).
0+x [@]	(5/2 ⁺)		A	E(level),J ^π : this level may be the ground state of ¹²³ Ce based on proton decay of g.s. of ¹²³ Ce to ¹²² Ba.
0+y [#]	(7/2 ⁺)		A	
0+z ^{&}	(7/2 ⁻)		A	
270.70+z ^{&} 10	(11/2 ⁻)		A	
273.00+x [@] 10	(9/2 ⁺)		A	
335.80+y [#] 10	(11/2 ⁺)		A	
638.50+z ^{&} 15	(15/2 ⁻)		A	
669.40+x [@] 15	(13/2 ⁺)		A	
788.90+y [#] 15	(15/2 ⁺)		A	
1131.10+z ^{&} 18	(19/2 ⁻)		A	
1176.60+x [@] 18	(17/2 ⁺)		A	
1347.10+y [#] 18	(19/2 ⁺)		A	
1728.60+z ^{&} 20	(23/2 ⁻)		A	
1781.20+x [@] 20	(21/2 ⁺)		A	
1995.20+y [#] 20	(23/2 ⁺)		A	
2407.31+z ^{&} 23	(27/2 ⁻)		A	
2466.6+x [@] 3	(25/2 ⁺)		A	
2715.11+y [#] 23	(27/2 ⁺)		A	
3131.7+z ^{&} 3	(31/2 ⁻)		A	
3211.6+x [@] 11	(29/2 ⁺)		A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{123}Ce Levels (continued)

E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF
3456.1+y [#] 3	(31/2 ⁺)	A	4210.7+y [#] 4	(35/2 ⁺)	A	4994.1+y [#] 5	(39/2 ⁺)	A
3874.9+z ^{&} 4	(35/2 ⁻)	A	4658.5+z ^{&} 5	(39/2 ⁻)	A	5513.5+z ^{&} 11	(43/2 ⁻)	A
3958.6+x [@] 15	(33/2 ⁺)	A	4778.6+x [@] 18	(37/2 ⁺)	A	5833.1+y [#] 11	(43/2 ⁺)	A

[†] From a least-squares fit to γ -ray energies.

[‡] Tentative assignments as suggested by 2012Sm04 based on J^π assignments of low-lying levels from systematics of neighboring nuclei and cascades of $\Delta J=2$, quadrupole (most likely E2) transitions built on these states. It should be noted, however, that cascading interband M1/E2 transitions are not reported.

[#] Band(A): Possible $\nu 5/2[413], \alpha=-1/2$. Spherical orbital= $g_{7/2}$.

[@] Band(a): Possible $\nu 5/2[413], \alpha=+1/2$ Spherical orbital= $g_{7/2}$.

[&] Band(B): Possible $\nu 5/2[532], \alpha=-1/2$ Spherical orbital= $h_{11/2}$.

 $\gamma(^{123}\text{Ce})$

E _i (level)	J _i ^π	E _γ [†]	I _γ [†]	E _f	J _f ^π	Mult. [‡]
270.70+z	(11/2 ⁻)	270.7 1	100	0+z	(7/2 ⁻)	Q
273.00+x	(9/2 ⁺)	273.0 1	100	0+x	(5/2 ⁺)	(Q)
335.80+y	(11/2 ⁺)	335.8 1	100	0+y	(7/2 ⁺)	Q
638.50+z	(15/2 ⁻)	367.8 1	100	270.70+z	(11/2 ⁻)	Q
669.40+x	(13/2 ⁺)	396.4 1	100	273.00+x	(9/2 ⁺)	Q
788.90+y	(15/2 ⁺)	453.1 1	100	335.80+y	(11/2 ⁺)	Q
1131.10+z	(19/2 ⁻)	492.6 1	100	638.50+z	(15/2 ⁻)	(Q)
1176.60+x	(17/2 ⁺)	507.2 1	100	669.40+x	(13/2 ⁺)	Q
1347.10+y	(19/2 ⁺)	558.2 1	100	788.90+y	(15/2 ⁺)	Q
1728.60+z	(23/2 ⁻)	597.5 1	100	1131.10+z	(19/2 ⁻)	Q
1781.20+x	(21/2 ⁺)	604.6 1	100	1176.60+x	(17/2 ⁺)	Q
1995.20+y	(23/2 ⁺)	648.1 1	100	1347.10+y	(19/2 ⁺)	Q
2407.31+z	(27/2 ⁻)	678.7 1	100	1728.60+z	(23/2 ⁻)	Q
2466.6+x	(25/2 ⁺)	685.4 2	100	1781.20+x	(21/2 ⁺)	(Q)
2715.11+y	(27/2 ⁺)	719.9 1	100	1995.20+y	(23/2 ⁺)	Q
3131.7+z	(31/2 ⁻)	724.4 2	100	2407.31+z	(27/2 ⁻)	Q
3211.6+x	(29/2 ⁺)	745 1	100	2466.6+x	(25/2 ⁺)	
3456.1+y	(31/2 ⁺)	741.0 2	100	2715.11+y	(27/2 ⁺)	Q
3874.9+z	(35/2 ⁻)	743.2 2	100	3131.7+z	(31/2 ⁻)	Q
3958.6+x	(33/2 ⁺)	747 1	100	3211.6+x	(29/2 ⁺)	
4210.7+y	(35/2 ⁺)	754.6 2	100	3456.1+y	(31/2 ⁺)	Q
4658.5+z?	(39/2 ⁻)	783.6 [#] 2	100	3874.9+z	(35/2 ⁻)	
4778.6+x?	(37/2 ⁺)	820 [#] 1	100	3958.6+x	(33/2 ⁺)	
4994.1+y	(39/2 ⁺)	783.4 2	100	4210.7+y	(35/2 ⁺)	Q
5513.5+z?	(43/2 ⁻)	855 [#] 1	100	4658.5+z?	(39/2 ⁻)	
5833.1+y?	(43/2 ⁺)	839 [#] 1	100	4994.1+y	(39/2 ⁺)	

[†] From ($^{64}\text{Zn}, \alpha\gamma$) (2012Sm04).

[‡] From angular anisotropy ratio in ($^{64}\text{Zn}, \alpha\gamma$) (2012Sm04). Multiplicity=Q indicates $\Delta J=2$, quadrupole (most likely E2) transition.

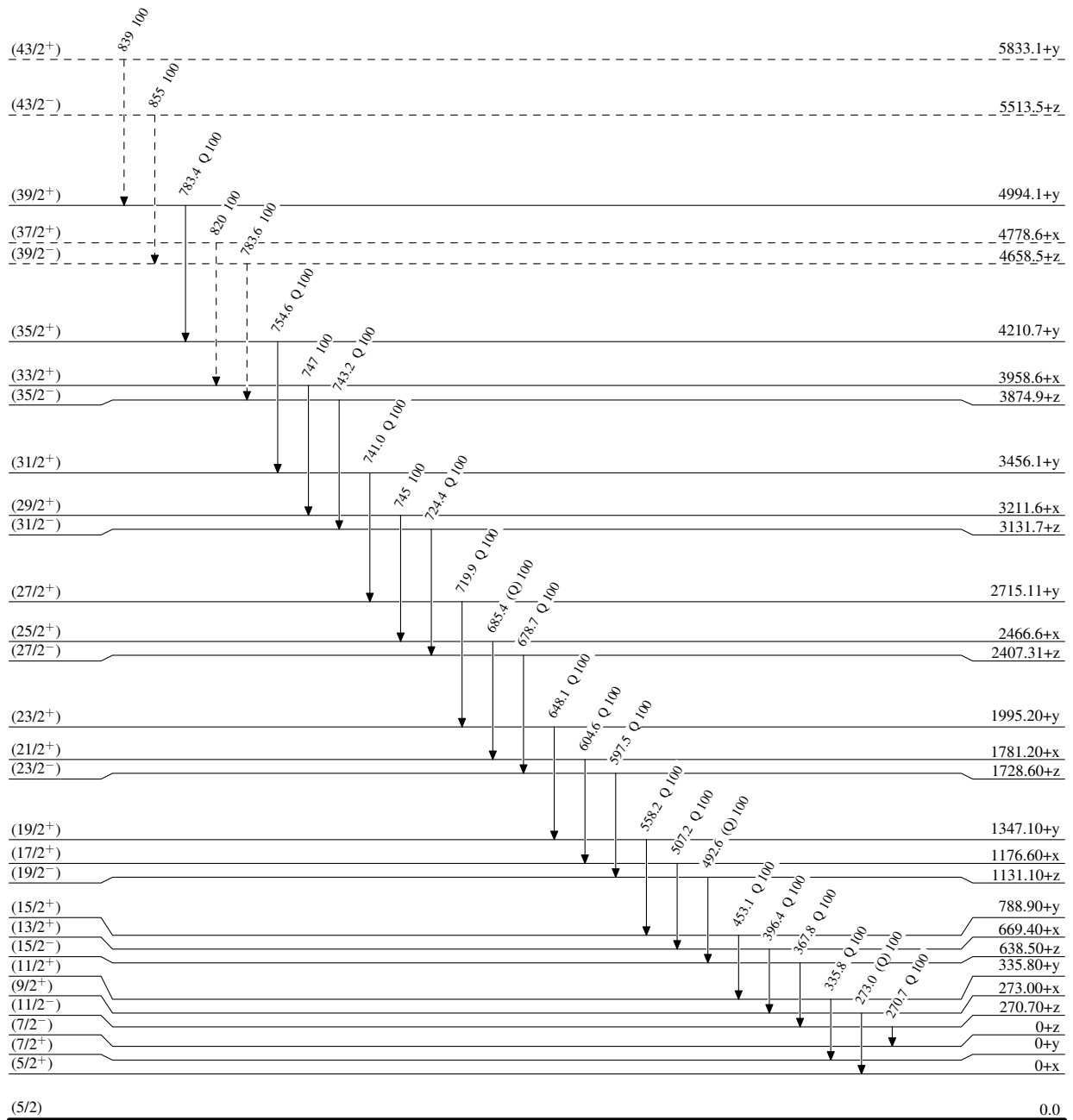
[#] Placement of transition in the level scheme is uncertain.

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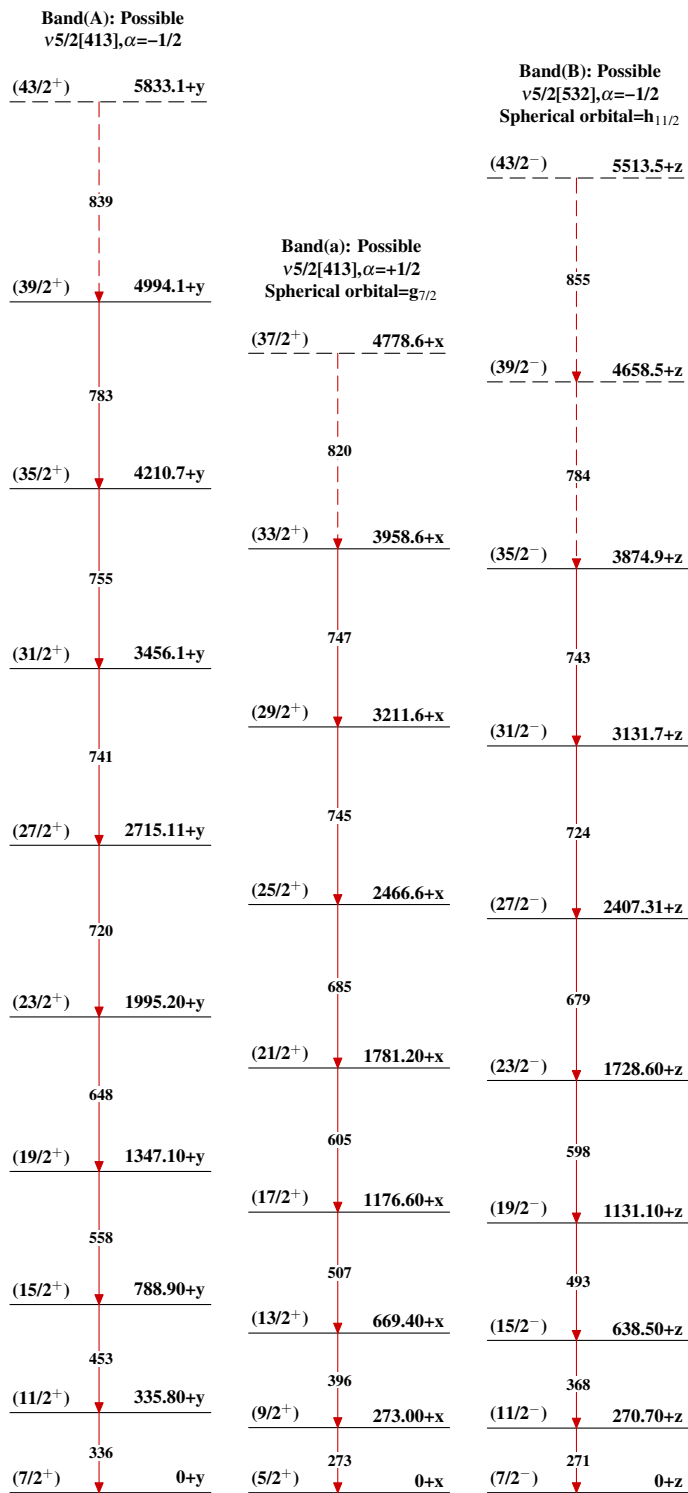
Legend

Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, Gammas

 $^{123}_{58}\text{Ce}_{65}$