Coulomb excitation **2012Ah01,1989Ga24**

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 152, 331 (2018)	1-Apr-2018

2012Ah01: C(^{136}Ce,^{136}Ce′γ) with E(^{136}Ce)=475 MeV. Measured Eγ, Iγ using the Gammasphere array consisting of 101 Compton-suppressed HPGe detectors. Analysis was performed with the multistep Coulomb excitation code CLX. Values are relative to the known B(E2) transition strength from the first 2^+ excited; authors used B(E2)(522 to 0)(W.u.)=39 *4*.

1989Ga24: Ce(p,p′) with E(p)=3 MeV. Measured Eγ, Iγ; deduced B(E2) for first 2^+ and deformation parameter.

^{136}Ce Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0	0^+	6.7 ps *8*	
552	2^+		B(E2)↑=0.81 *9* (1989Ga24) $T_{1/2}$: deduced by evaluator from B(E2) and Adopted Gamma properties. β_2=0.171 *9* (1989Ga24).
1092	2^+	4.4 ps *7*	B(E2)↑=0.0114 *19* B(E2)↑: deduced by evaluator from B(E2)(W.u.)=0.55 *9* (2012Ah01). B(E2)↑: B(E2)(552 to 1092) = 0.199 *29*, deduced by evaluator from B(E2)(W.u.)=48 *7* (2012Ah01). $T_{1/2}$: weighted average of 4.3 ps *7* and 4.5 ps *7* deduced by evaluator from B(E2)(0 to 1092)=0.0114 *19* and B(E2)(552 to 1092)=0.199 *29*, respectively and Adopted Gamma properties.
1314	4^+	0.94 ps *17*	B(E2)↑=0.42 *7* B(E2)↑: deduced by evaluator from B(E2)(W.u.)=56 *10* (2012Ah01). No E4 contribution is included in the population of the level. $T_{1/2}$: deduced by evaluator from B(E2) and Adopted Gamma properties.
1982	(3^-)		B(E3)↑=0.19 *3* (2012Ah01) J$^\pi$: absence of decay to ground state and sizable population in Coulomb excitation.
2067	2^+	0.151 ps *16*	B(E2)↑=0.025 *13* B(E2)↑: deduced by evaluator from B(E2)(W.u.)=1.2 *6* (2012Ah01). B(E2)↑: B(E2)(552 to 2067) = 0.00328 *16*, deduced by evaluator from B(E2)(W.u.)=0.79 *4* (2012Ah01). B(E2)↑: B(E2)(1092 to 2067) ≤0.037, deduced by evaluator from B(E2)(W.u.)≤7 *2* (2012Ah01); upper limit based on the assumption of a pure E2 transition. $T_{1/2}$: deduced by evaluator from B(E2)(552 to 2067) = 0.00328 *16* and Adopted Gamma properties.
2155	2^+	0.039 ps *5*	B(E2)↑=0.0116 *6* B(E2)↑: deduced by evaluator from B(E2)(W.u.)=0.56 *3* (2012Ah01). B(E2)↑: B(E2)(552 to 2155) = 0.0166 *12*, deduced by evaluator from B(E2)(W.u.)=4.0 *3* (2012Ah01). B(E2)↑: B(E2)(1092 to 2155) ≤0.054, deduced by evaluator from B(E2)(W.u.)≤11 *2* (2012Ah01); upper limit based on the assumption of a pure E2 transition. $T_{1/2}$: deduced by evaluator from B(E2)=0.0116 *6* and Adopted Gamma properties.
2275	(2^+)	0.305 ps *25*	B(E2)↑=0.0118 *8* B(E2)↑: deduced by evaluator from B(E2)(W.u.)=0.57 *4* (2012Ah01). B(E2)↑: B(E2)(552 to 2275) ≤ 0.0033, deduced by evaluator from B(E2)(W.u.)≤0.6 *2* (2012Ah01); upper limit based on the assumption of a pure E2 transition. $T_{1/2}$: deduced by evaluator from B(E2)=0.0118 *8* and Adopted Gamma properties. J$^\pi$: strong decay to ground state and strong population in Coulomb excitation.
2451	(2^+)	0.17 ps *3*	B(E2)↑=0.0054 *6* B(E2)↑: deduced by evaluator from B(E2)(W.u.)=0.26 *3* (2012Ah01). B(E2)↑: B(E2)(552 to 2451) ≤ 0.0046, deduced by evaluator from B(E2)(W.u.)≤0.9 *2* (2012Ah01); upper limit based on the assumption of a pure E2 transition. B(E2)↑: B(E2)(1092 to 2451) ≤ 0.033, deduced by evaluator from B(E2)(W.u.)≤6 *2* (2012Ah01); upper limit based on the assumption of a pure E2 transition. $T_{1/2}$: deduced by evaluator from B(E2)=0.0054 *6* and Adopted Gamma properties.

Continued on next page (footnotes at end of table)

Coulomb excitation 2012Ah01,1989Ga24 (continued)

^{136}Ce Levels (continued)

† Rounded values from the Adopted Levels.
‡ From the Adopted Levels. Instances where the support for the J^{π} assignment is based on 2012Ah01 are indicated in the comments.

$\gamma(^{136}Ce)$

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
540	6.5 *3*	1092	2^+	552	2^+	
552	1000 *4*	552	2^+	0	0^+	
762	5.5 *1*	1314	4^+	552	2^+	
x873† *1*	<1×10^{-4}					
890	0.33 *1*	1982	(3^-)	1092	2^+	
975	0.103 *4*	2067	2^+	1092	2^+	
1063	0.023 *4*	2155	2^+	1092	2^+	
1092	2.39 *4*	1092	2^+	0	0^+	
x1139† *1*	<1×10^{-4}					
1359	0.040 *12*	2451	(2^+)	1092	2^+	
1430	3.4 *1*	1982	(3^-)	552	2^+	
1515	0.59 *1*	2067	2^+	552	2^+	
1603	0.41 *2*	2155	2^+	552	2^+	
1722	0.086 *4*	2275	(2^+)	552	2^+	
x1750† *1*	<1×10^{-4}					
x1796† *1*	<1×10^{-4}					
1899	0.030 *2*	2451	(2^+)	552	2^+	
(1982)	<0.01	1982	(3^-)	0	0^+	I_γ: transition not observed, upper limit for intensity is estimated from the detection limit.
2067	0.74 *2*	2067	2^+	0	0^+	
2155	0.035 *5*	2155	2^+	0	0^+	
2275	0.30 *1*	2275	(2^+)	0	0^+	
x2369† *5*	<1×10^{-4}					
2451	0.029 *9*	2451	(2^+)	0	0^+	

† Observed in $\gamma\gamma$-coin spectra, could not be placed in the level scheme due to insufficient statistics.
x γ ray not placed in level scheme.

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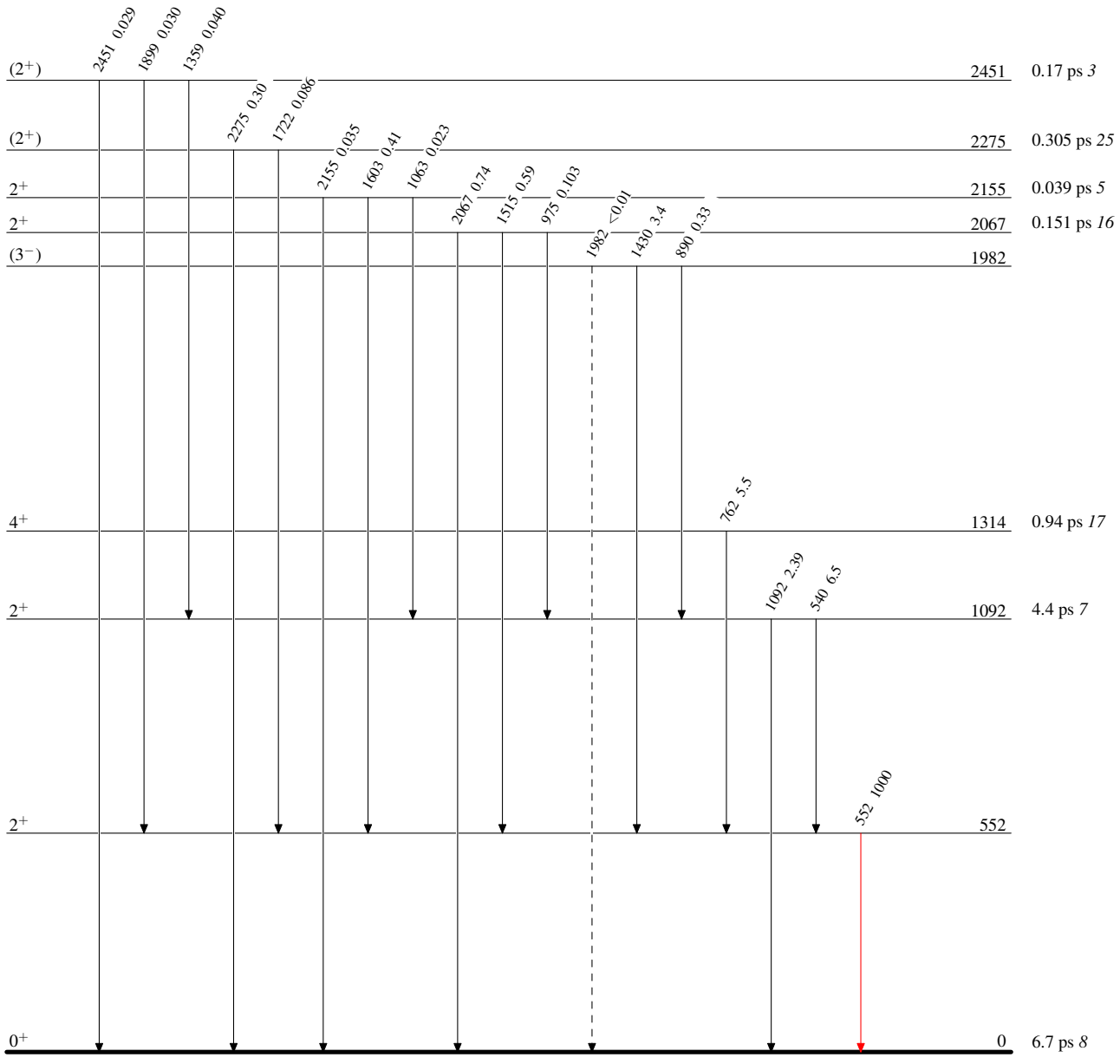
Level Scheme

Intensities: Relative I_γ

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)



$^{136}_{58}Ce_{78}$