

Coulomb excitation

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev		NDS 112, 855 (2011)	31-Oct-2010
<p>1973Re08: ¹³³Cs($\alpha, \alpha'\gamma$) E=6-11 MeV, E=12 MeV (1975An19); measured Coul. ex., $\sigma(E\alpha, E\gamma, 55^\circ)$, $\sigma(E\gamma, \theta)$; deduced levels, J^π, B(E2)\uparrow values. Van de Graaff generator; Ge(Li) detector, placed at $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ, 80^\circ$.</p> <p>1974Er05: ¹³³Cs(¹⁴N, ¹⁴N'γ) E=50 MeV; measured Coul. ex.; deduced levels, J^π, B(E2)\uparrow, B(M1)\uparrow, life-time. Cyclotron, Ge(Li) detector, DSA method.</p> <p>1975An19: ¹³³Cs(¹²C, ¹²C'γ) E=41 MeV; measured Coul. ex., photon branching, life-time; deduced levels, B(E2)\uparrow. Cyclotron, Ge(Li)detectors, DSA method.</p> <p>1979Th02: ¹³³Cs($\alpha, \alpha'\gamma$) E=11 MeV; measured α spectra, $\gamma\gamma$, $\gamma(\theta, H)$; deduced B(E2)\uparrow, life-time, δ, μ. Tandem, Si(Li), Ge(Li), NaI(Tl) detectors; IPAC method.</p> <p>1985Si10: ¹³³Cs(p, p'γ), E=3.2-4.2 MeV; measured Coul. ex., $E\gamma$, $\gamma(Ep)$, $\gamma(\theta)$; deduced levels, γ-branching, B(E2)\uparrow, B(M1)\uparrow, δ, J^π. Variable energy cyclotron, Ge(Li) detector.</p> <p>Other: 1967Im01.</p>				

¹³³Cs Levels

E(level) \dagger	J^π $\#$	$T_{1/2}\ddagger$	Comments
0.0	7/2 ⁺	stable	
80.94 21	5/2 ⁺	4.5 ns +17-9	B(E2) \uparrow =0.022 4 (1967Im01) $T_{1/2}$: from B(E2).
160.47 21	5/2 ⁺	167 ps 17	B(E2) \uparrow =0.067 7 B(E2) \uparrow : weighted average of 0.058 4 (1975An19), 0.082 9 (1985Si10), 0.084 9 (1979Th02), 0.078 9 (1973Re08). $T_{1/2}$: from B(E2). $I\gamma$, δ and α from adopted gammas.
383.7 3	3/2 ⁺	25 ps 4	B(E2) \uparrow =0.041 3 B(E2) \uparrow : weighted average of 0.046 4 (1975An19), 0.049 6 (1979Th02), 0.038 4 (1985Si10), 0.036 4 (1973Re08). $T_{1/2}$: from B(E2). $I\gamma$, δ and α from adopted gammas.
436.9 6	1/2 ⁺		
632.6 4	11/2 ⁺	5.3 ps 4	$T_{1/2}$: from B(E2) \uparrow = 0.157 4, weighted average of 0.158 4 (1975An19), 0.150 12 (1985Si10), 0.156 10 (1979Th02), 0.150 16 (1973Re08).
641.0 4	3/2 ⁺	0.76 ps 14	B(E2) \uparrow =0.0084 7 B(E2) \uparrow : weighted average of 0.084 7 (1975An19), 0.007 1 (1973Re08), 0.010 1 (1985Si10). $T_{1/2}$: from DSA measurements.
705.4 3	9/2 ⁺		B(E2) \uparrow =0.0124 7 B(E2) \uparrow : weighted average of 0.012 1 (1975An19), 0.0142 17 (1973Re08), 0.0122 13 (1985Si10).
767.8 4	9/2 ⁺	2.0 ps 4	B(E2) \uparrow =0.077 7 B(E2) \uparrow : weighted average of 0.072 8 (1975An19), 0.072 8 (1985Si10), 0.098 10 (1979Th02), 0.092 10 (1973Re08). $T_{1/2}$: from DSA measurements. Other: 1.2 ps 4 (1974Er05).
787.8? 5			B(E2) \uparrow <0.001 (1975An19) B(E2) \uparrow : Other: \leq 0.003 (1973Re08).
818.8 3		1.0 ps 3	B(E2) \uparrow =0.0039 9 B(E2) \uparrow : weighted average of 0.0037 4 (1975An19), 0.0045 15 (1973Re08). $T_{1/2}$: from DSA measurements.
872.0 4	7/2 ⁺	1.2 ps 3	B(E2) \uparrow =0.041 11 B(E2) \uparrow : weighted average of 0.030 3 (1975An19), 0.035 5 (1973Re08), 0.066 4 (1985Si10).
915.7 3		2.3 ps +10-5	$T_{1/2}$: from DSA measurements. Other: 1.0 ps 3 (1974Er05). B(E2) \uparrow =0.0044 6 (1975An19) B(E2) \uparrow : Other: 0.006 3 (1973Re08). $T_{1/2}$: from DSA measurements.

Continued on next page (footnotes at end of table)

Coulomb excitation (continued) ^{133}Cs Levels (continued)

<u>E(level)[†]</u>	<u>Comments</u>
941.8 4	B(E2) [†] =0.0005 2 (1975An19) B(E2) [†] : Other: <0.007 (1973Re08).

[†] From least-squares fit to $E\gamma$'s.

[‡] From 1975An19, except as noted.

[#] From $\gamma(\theta)$ (1985Si10).

<u>$E_i(\text{level})$</u>	<u>$\gamma(^{133}\text{Cs})$</u>								
	<u>J_i^π</u>	<u>E_γ[‡]</u>	<u>I_γ[#]</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.[@]</u>	<u>δ[@]</u>	<u>α[†]</u>	<u>Comments</u>
80.94	5/2 ⁺	81.0 4	100	0.0	7/2 ⁺				
160.47	5/2 ⁺	79.4 4	100	80.94	5/2 ⁺				
383.7	3/2 ⁺	160.5 4	14	0.0	7/2 ⁺	M1+E2	-0.87 +20-16	0.289 15	
		223.2 4	2.3	160.47	5/2 ⁺	M1+E2	+0.18 3	0.0978 15	
		302.7 4	100	80.94	5/2 ⁺	M1+E2	+0.14 +2-3	0.0434 7	
436.9	1/2 ⁺	383.8 4	44	0.0	7/2 ⁺	E2		0.0202	
		356.0 5	100	80.94	5/2 ⁺	E2		0.0254	E_γ : from 1975An19.
		632.6	11/2 ⁺	632.6 4	100	0.0	7/2 ⁺	E2	0.00503 7
641.0	3/2 ⁺	480.6 4	100	160.47	5/2 ⁺	M1+E2	-0.10 3	0.01333	
		559.9 4	95	80.94	5/2 ⁺	M1+E2	1.3 +10-6	0.0078 7	
		(641 1)	4	0.0	7/2 ⁺	[E2]		0.00487 7	I_γ : from $T_{1/2}$ and B(E2) (1975An19).
705.4	9/2 ⁺	624.4 4	100	80.94	5/2 ⁺	E2		0.00520 8	
		705.5 4	28 3	0.0	7/2 ⁺				
767.8	9/2 ⁺	606.9 5	9 1	160.47	5/2 ⁺	(E2)		0.00560 8	E_γ : from 1975An19.
		768.2 5	100	0.0	7/2 ⁺				E_γ : from 1975An19.
787.8?		787.8 & 5	100	0.0	7/2 ⁺				
818.8	7/2 ⁺	658.1 5	40	160.47	5/2 ⁺				E_γ : from 1975An19.
		738.0 5	60	80.94	5/2 ⁺				E_γ : from 1975An19.
		818.8 4	100	0.0	7/2 ⁺				
872.0	7/2 ⁺	711.7 5	18	160.47	5/2 ⁺				E_γ : from 1975An19.
		871.9 4	100	0.0	7/2 ⁺	M1+E2	+0.70 +5-8	0.00290 6	
915.7	7/2 ⁺	755.4 4	65	160.47	5/2 ⁺				
		835.0 5	65	80.94	5/2 ⁺				E_γ : from 1975An19.
		915.3 5	100	0.0	7/2 ⁺				E_γ : from 1975An19.
941.8	7/2 ⁺	861.0 4	100	80.94	5/2 ⁺				
		940.8 9	38 11	0.0	7/2 ⁺				E_γ, I_γ : γ is not measured in 1975An19. E_γ and branching are from adopted γ 's.

[†] Additional information 1.

[‡] Weighted average from 1973Re08 and 1975An19 when available, except as noted. ΔE_γ in 1975An19 is assumed 0.5 keV by evaluators.

[#] Relative photon branching from each level (1975An19).

[@] From $\gamma(\theta)$ (1985Si10).

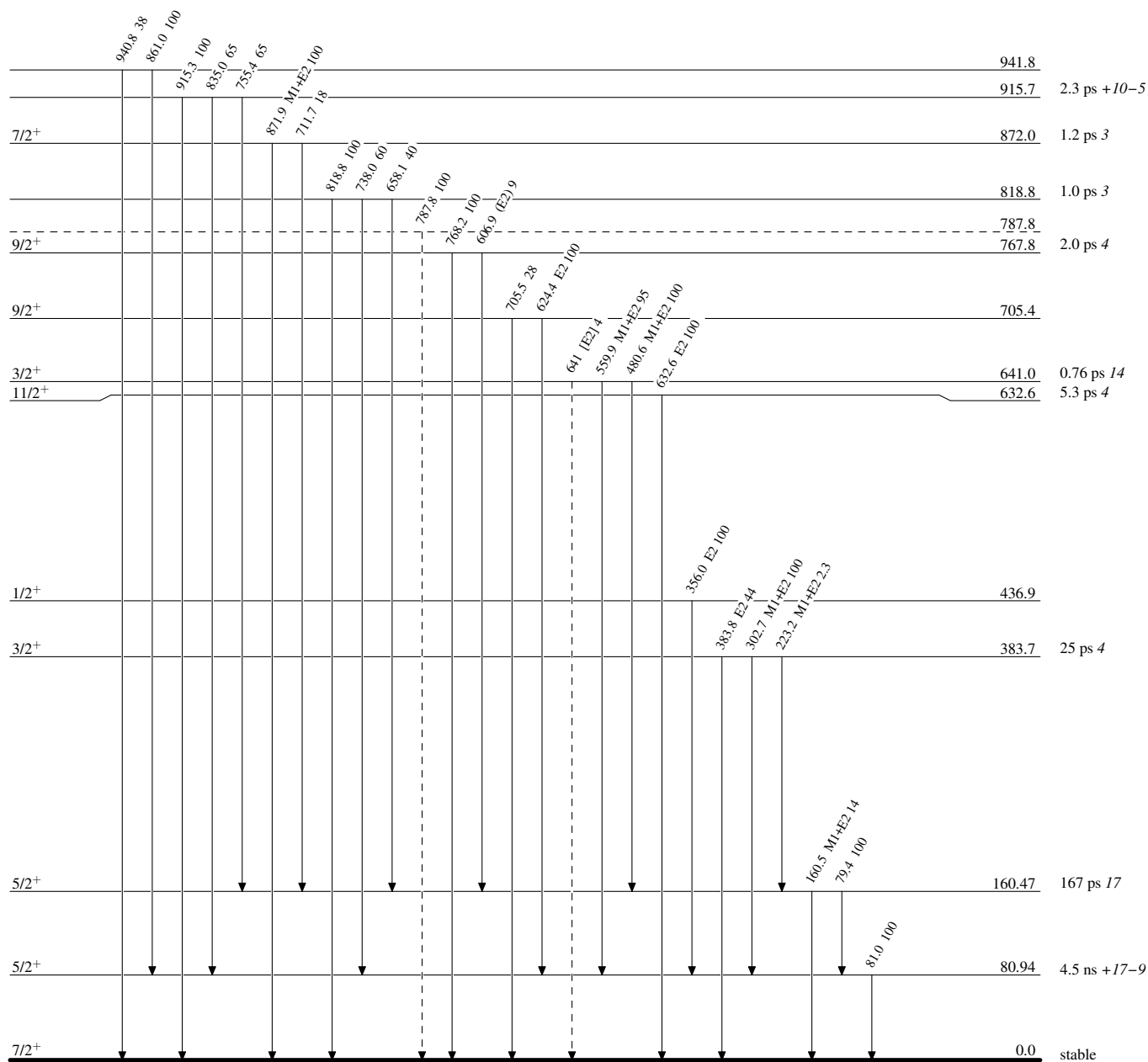
[&] Placement of transition in the level scheme is uncertain.

Coulomb excitation

Legend

Level Scheme

Intensities: % photon branching from each level

-----► γ Decay (Uncertain) $^{133}_{55}\text{Cs}_{78}$