^{140}**Ce($\alpha,\alpha'\gamma$)**   **2009En03**

	Type	Author	History Citation	Literature Cutoff Date
	Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

Dataset based on unevaluated XUNDL file compiled by K. Abusaleem (U. of Jordan) and B. Singh (McMaster) from 2009En03.

2009En03: experiment carried at the AGOR cyclotron at KVI, Germany, E=136 MeV and beam current of=0.7 pnA. The target was 92.72% enriched, in ^{140}Ce, self-supporting, 6.8 mg/cm^2 thick. Ions were detected with the light EUROSUPERNOVA comprised of two drift chambers and two scintillator planes. The emitted γ-rays were detected using seven HPGe detectors. The detectors were calibrated using ^{56}Co source. The Big-Bite spectrometer was used for α particles. The total photopeak efficiency was 0.45% at Eγ=1.33 MeV and 0.15% at Eγ=6.0 MeV The elastically scattered α-particles were blocked using Al plate.

Measured ion energy, Eγ, Iγ, α-γ coin, $\alpha\gamma(\theta)$.

Related papers (Pygmy Dipole Resonance): 2011Sa70, 2009EnZY, 2008SaZL, 2007Sa48, 2006Sa37.

^{140}Ce Levels

E(level)	$J^{\pi\dagger}$	dσ/dΩ (mb/sr)‡	E(level)	$J^{\pi\dagger}$	dσ/dΩ (mb/sr)‡	E(level)	$J^{\pi\dagger}$	dσ/dΩ (mb/sr)‡
0.0	0^+		5157.4 *12*	$1^{(-)}$	0.116 *25*	5573.9 *14*	$1^{(-)}$	0.14 *3*
3643.9 *6*	$1^{(-)}$	0.176 *20*	5190.3 *10*	$1^{(-)}$	0.17 *3*	5660.0 *6*	$1^{(-)}$	0.34 *4*
4173.7 *8*	$1^{(-)}$	0.140 *19*	5211.7 *14*	$1^{(-)}$	0.067 *24*	5928.7 *10*	$1^{(-)}$	0.13 *4*
4515.0 *9*	$1^{(-)}$	0.109 *19*	5337.4 *9*	$1^{(-)}$	0.35 *4*	6161.8 *14*	$1^{(-)}$	0.35 *4*
4787.9 *9*	$1^{(-)}$	0.084 *21*	5548.5 *7*	$1^{(-)}$	0.20 *3*			

† Spin: from gamma-ray measured multipolarity (based on $\alpha\gamma(\theta)$); parity: only natural parities are excited under the kinematic conditions of the experiment.

‡ No significant branching of the 1^- states into excited states could be observed and Γ_0/Γ=1 was assumed in the determination of the cross sections; however because many weak and unobserved branchings can exist, the extracted cross sections are rather lower limits (2009En03).
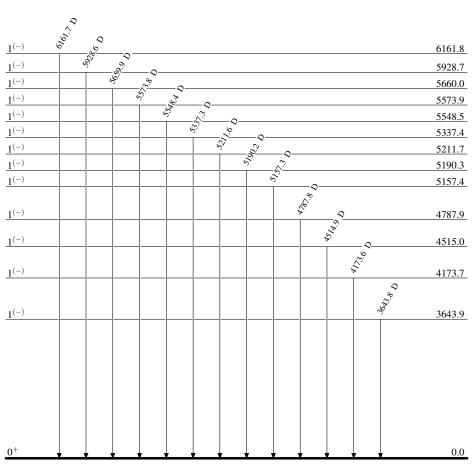
$\gamma(^{140}$Ce)

E$_\gamma$	E$_i$(level)	J^{π}_i	E$_f$	J^{π}_f	Mult.†	E$_\gamma$	E$_i$(level)	J^{π}_i	E$_f$	J^{π}_f	Mult.†
3643.8 *6*	3643.9	$1^{(-)}$	0.0	0^+	D	5337.3 *9*	5337.4	$1^{(-)}$	0.0	0^+	D
4173.6 *8*	4173.7	$1^{(-)}$	0.0	0^+	D	5548.4 *7*	5548.5	$1^{(-)}$	0.0	0^+	D
4514.9 *9*	4515.0	$1^{(-)}$	0.0	0^+	D	5573.8 *14*	5573.9	$1^{(-)}$	0.0	0^+	D
4787.8 *9*	4787.9	$1^{(-)}$	0.0	0^+	D	5659.9 *6*	5660.0	$1^{(-)}$	0.0	0^+	D
5157.3 *12*	5157.4	$1^{(-)}$	0.0	0^+	D	5928.6 *10*	5928.7	$1^{(-)}$	0.0	0^+	D
5190.2 *10*	5190.3	$1^{(-)}$	0.0	0^+	D	6161.7 *14*	6161.8	$1^{(-)}$	0.0	0^+	D
5211.6 *14*	5211.7	$1^{(-)}$	0.0	0^+	D						

† Based on $\alpha\gamma(\theta)$ measurements all γ transitions are dipole, (E1) deduced from the tentative negative parity of parent states decaying to 0^+ g.s.

^{140}Ce$(\alpha,\alpha'\gamma)$ **2009En03**

Level Scheme

$^{140}_{58}$Ce$_{82}$