

Coulomb excitation 2013Ba38

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 M.S. Basunia (LBNL) from [2013Ba38](#).

[2013Ba38](#) used ^{140}Nd beam, and ^{48}Ti and ^{64}Zn targets.

In two subsequent runs, 2.85 MeV/nucleon ^{140}Nd beam from REX-ISOLDE facility at CERN, bombarded ^{48}Ti (thickness=1.4 mg/cm²) and ^{64}Zn (Thickness 1.55 mg/cm²) targets for Coulomb excitation. The ions of interest were produced in a primary target of tantalum and were extracted using highly selective laser ionization source RILIS. The beam was contaminated by Sm ions of same mass ($\approx 50\%$). γ rays were detected using high-purity germanium cluster array MINIBALL covering about 2π of the solid angle. Target like recoil nuclei detected by double-sided silicon detector (DSSD) in coincidence with γ rays. Coulomb excitation cross section was measured relative to known cross sections of target (^{48}Ti , ^{64}Zn) excitations and corrected for contamination from ^{140}Sm . Compared experimental results to microscopic calculations, quasiparticle phonon model (QPM) and large-scale shell-model (LSSM).

The E2 transition is suppressed to some extent in ^{138}Ce and enhanced in ^{140}Nd , concluded in [2013Ba38](#) from comparisons of calculated and measured B(E2) strengths in connection to the systematics of N=80 isotones. Such an anomaly is ascribed to the filling of $\pi(g_{7/2})$ subshell for Z=58.

 ^{140}Nd Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	0^+		
773.65 6	2^+	1.40 ps 11	B(E2) \uparrow =0.725 56 E(level), J^π : from Adopted Levels, Gammas dataset. B(E2) \uparrow : weighted average of BE2 \uparrow =0.74 8 and 0.71 8 with ^{48}Ti and ^{64}Zn targets, respectively. 2013Ba38 list BE2 \uparrow =0.72 5. $T_{1/2}$: deduced by evaluator from BE2 \uparrow =0.725 56.

 $\gamma(^{140}\text{Nd})$

$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α^\dagger	Comments
773.65	2^+	773.74 6	100	0.0	0^+	E2	0.00396	$\alpha(\text{K})=0.00334$ 5; $\alpha(\text{L})=0.000483$ 7; $\alpha(\text{M})=0.0001028$ 15 $\alpha(\text{N})=2.29\times 10^{-5}$ 4; $\alpha(\text{O})=3.42\times 10^{-6}$ 5; $\alpha(\text{P})=2.01\times 10^{-7}$ 3 E_γ, I_γ : from Adopted Levels, Gammas dataset.

\dagger [Additional information 1.](#)

Coulomb excitation 2013Ba38Level Scheme

Intensities: Relative photon branching from each level

