

Estimated $B(E2)$ values for neutron-rich actinide nuclei

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In even–even nuclei of this region, the $B_w(E2; 2_1^+ \rightarrow 0_1^+)$ values were calculated within the self-consistent nuclear mean-field model and compared with experimental data. This shows that the calculations have good predictive power for as-yet-unmeasured transition probabilities. The calculations were performed using density functional theory (DFT) – UDF1m [1] within the Hartree–Fock–Bogolyubov (HFB) method. The corresponding results are presented in the table together with the available experimental data.

Th			U			Pu			Cm		
N	Exp.	Theor.	N	Exp.	Theor.	N	Exp.	Theor.	N	Exp.	Theor.
142	198(11)	204	144	248(8)	256	144		289	144	250(230)	320
144	183(16)	223	146	281(4)	268	146	287(11)	299	146		328
146		237	148		274	148	301(14)	303	148	419(23)	332
148		245	150		274	150	300(30)	302	150	326(8)	330
150		246	152		276	152		297	152	324(4)	325
			154		259	154		286	154		316
						156		274	156		302

Since the considered atomic nuclei are well deformed, the following estimates $B(E2; I+2 \rightarrow I) = \frac{15}{2} \frac{(I+2)(I+1)}{(2I+5)(2I+3)} B(E2; 2_1^+ \rightarrow 0_1^+)$ can be applied to them up to certain spins in the ground-state band. Together with the transition energies, this allows one to estimate the intensities of the corresponding transitions. It should also be noted that the obtained estimates for $B(E2)$ can be used as reference points in calculations within other theoretical approaches.

References

1. J. Dobaczewski, P. Baczyk, P. Becker, J. Phys. G: Nucl. Part. Phys. **48**, 102001 (2021).