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Covariant density functional theory: an estimation of systematic uncertainties[1] AHMAD TANINAH, S. E. AGBEMAVA, A. V. AFANASJEV, Mississippi State Univ — The systematic investigation of the ground state and fission properties of even-even actinides and superheavy nuclei with $Z = 90 - 120$ from the two-proton up to two-neutron drip lines with proper assessment of systematic theoretical uncertainties has been performed for the first time in the framework of covariant density functional theory (CDFT). Four state-of-the-art globally tested covariant energy density functionals (CEDFs), namely, DD-PC1, DD-ME2, NL3* and PC-PK1, representing the major classes of the CDFT models are employed in the present study. Ground state deformations, binding energies, two neutron separation energies, α-decay Q_α values and half-lives and the heights of fission barriers have been calculated for all these nuclei. Theoretical uncertainties in these physical observables and their evolution as a function of proton and neutron numbers have been quantified and their major sources have been identified. Spherical shell closures at $Z = 120$, $N = 184$ and $N = 258$ and the structure of the single-particle (especially, high-j) states in their vicinities as well as nuclear matter properties of employed CEDFs are two major factors contributing into theoretical uncertainties.

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