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Survey of Reflection-Asymmetric Nuclear Deformations ERIK OLSEN, YUCHEN CAO, WITOLD NAZAREWICZ, Michigan State University, NICOLAS SCHUNCK, Lawrence Livermore National Laboratory — Due to spontaneous symmetry breaking it is possible for a nucleus to have a deformed shape in its ground state. It is theorized that atoms whose nuclei have reflection-asymmetric or pear-like deformations could have non-zero electric dipole moments (EDMs). Such a trait would be evidence of CP-violation, a feature that goes beyond the Standard Model of Physics. It is the purpose of this project to predict which nuclei exhibit a reflection-asymmetric deformation and which of those would be the best candidates for an EDM measuring experiment. Using nuclear Density Functional Theory along with the new computer code AxialHFB and massively parallel computing we calculated ground state nuclear properties for thousands of even-even nuclei across the nuclear chart: from light to superheavy and from stable to short-lived systems. Six different Energy Density Functionals (EDFs) were used to assess systematic errors in our calculations. These results are to be added to the website Massexplorer (http://massexplorer.frib.msu.edu/) which contains results from earlier mass table calculations and information on single quasiparticle energies.

Erik Olsen
Michigan State University

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