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Effect of the Coulomb interaction on nuclear deformation and drip lines

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The energy density functional method is able to provide systematic analysis on properties of nuclei all over the nuclear chart.

We perform the calculations for nuclei from the proton to the neutron drip lines including superheavy nuclei.

Using HFBTHO program (Axially deformed solution of the Skyrme-Hartree-Fock-Bogoliubov equations using the transformed harmonic oscillator basis (II)), the effect of Coulomb interaction on the deformation of even-even nuclei and drip line is reported.

The results show that the Coulomb interaction increases the deformation of nuclei in the large mass number range and stretches the drip line toward the neutron side.

It is interesting to find that the Coulomb interaction gives additional binding to nuclei near the neutron drip line.

In order to understand microscopic mechanisms of these effects, we plan to report results of calculations with constraints on deformation, radius, etc.

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