Coupled cluster calculation of deformed nuclei. ZHONGHAO SUN,
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National Laboratory — We studied the ground states of deformed nuclei with the
coupled-cluster method. The reference state of the nuclei is generated by deformed
Hartree-Fock using the newly developed chiral potential including the Δ degree of
freedom. The normal ordered interaction is transformed into a natural orbit and
then truncated to affordable model space. We performed coupled-cluster calculation
without symmetry restoration based on the fact that the uncertainties for lacking
angular momentum projection are identical to that from triple up to A-particle-A-
hole excitations, which is well controlled in the coupled-cluster theory. We calculated
the ground state energy and charge radii of even-even nuclei from Z=20-30 and
N=24-40 and have good agreement with the data.

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