ISOSPIN-SYMMETRY-VIOLATION EFFECTS RESULTING FROM STRONG INTERACTIONS STUDIED THROUGH MIRROR AND TRIPLET DISPLACEMENT ENERGIES

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Isospin symmetry in atomic nuclei is violated predominantly by the Coulomb force. However, there is clear experimental evidence that the strong interaction is also different for *pp*, *nn* and *np* pairs, thus breaking both the charge independence (CI) and charge symmetry (CS). The aim of this study is to investigate the isospin-symmetry-breaking strong interactions by studying binding energies within the isobaric multiplets.

To account for the CI and CS breaking forces, we used mean-field method based on an isospin-invariant Skyrme interaction extended by adding zero-range interactions of class II and class III (according to the classification by Henley and Miller). The proposed extension was implemented within the code HFODD that allows for the *pn*-mixing in the particle-hole channel and restores the isospin symmetry by means of the isocranking method. These unique features are of critical importance for the study.

We performed a systematic study of the *T=1/2* and *T=1* multiplets in the *A=10-80* mass region with three different Skyrme parameterisations. The two free parameters of the model were adjusted to reproduce the experimental values of MDEs (Mirror Displacement Energies) and TDEs (Triplet Displacement Energies). This allowed us to reduce the discrepancy between experimental and theoretical values to, on average, ~100 keV, and to reproduce, for the first time, the *A=4n* and *A=4n+2* staggering of TDEs. We will also discuss (i) possible applications of the model to calculate MDEs and TDEs versus spin for rotational bands and (ii) links to the CI and CS breaking interactions deduced from *ab initio* methods.