

## Isospin Invariant Energy Density Functional Approach

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Recent studies have demonstrated that the existing energy density functionals have reached limits and significant changes to the form of the functional are needed to describe the experimental data with higher accuracy. As a step toward enriching the existing density functionals, we have generalized the Skyrme density functional by including all the densities as mandated by the isospin symmetry. In the standard density functionals, isoscalar and only single  $t_z$  component of the isovector densities are considered;  $t_x$  and  $t_y$  or p-n mixed densities are completely neglected.

Using the newly developed isospin invariant approach, results shall be presented for the isobaric analog states in  $A = 48$  and  $78$  chains in the Hartree Fock approximation. Recently, we have also extended the approach to include the isovector pairing and interesting coexistence of different pairing solutions shall be presented.