SENSITIVITIES OF ENERGIES OF GIANT RESONANCES TO PROPERTIES OF THE ENERGY DENSITY FUNCTIONAL

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We will first describe a method for determining a modern energy density functional (EDF), based on the effective nucleon-nucleon Skyrme type interaction, with an enhanced predictive power for properties of nuclei and the equation of state (EOS) of nuclear matter (NM), the needed ingredient in the study of nuclei and the structure and evolution of compact astrophysical objects. The parameters and some properties of the new and improved EDF (named KDE0 and KDE0v1) will be presented.

Next the results of HF-based RPA calculations of properties of neutron-rich nuclei and of multipole isoscalar and isovector giant resonances (strength distribution and centroid energies) will be presented and their sensitivity to NM properties, such as the incompressibility coefficient, the symmetry energy density and the effective mass, that are needed to determine the next generation EDF, will be discussed.