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Charge radii in nuclear DFT: developments and predictions (remote)

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Precision measurements in exotic beam facilities deliver great amounts of new information on isotopic shifts of nuclear charge radii. The radii as such are usually well described by modern nuclear density functional theory (DFT) within their typical extrapolation uncertainty of 0.02 fm. However, trends of radii which are quantified by radius differences, as istopic shifts, or three point differences, as oddd-even staggerings, are much more sensitive observables and they reveal great differences in the performance of the various DFT functionals. Radius differences thus provide invaluable information for scrutinizing and further developing of nuclear DFT.
The talk addresses recent studies within the non-realtivistic Skyrme and Fayans functionals aiming at a better description of trends of charge radii. The tools are least-squares fits to ground state data extended by information on recently measured radius differences with subsequent statistical analysis to explore the sensitivity of the new data to the various aspects of a functional. The data call clearly for an improved description of pairing which is achieved by the Fayans pairing functional. The analysis also points to the need for further extensions of the functionals.

Co-author: NAZAREWICZ, , W. (Michigan State University,)

Presenter: REINHARD, Paul-Gerhard (Friedrich-Alexander-University,)

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