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Symmetry energy in dilute and dense matter with extended energy density functionals

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Energy density functional (EDF) theory provides a unified framework for the description of nuclei and of infinite nuclear matter. In principle, it facilitates direct connections between nuclear data and the equation of state. In practice, traditional models have strained to describe finite nuclei and infinite systems at the same time. Recently developed extended EDF models overcome many of the limitations of traditional models [1-4]. I will present recent studies of the nuclear symmetry energy within EDF theory and especially the KIDS framework [4], with focus on the curvature of the symmetry energy, indications for a soft-to-stiff transition at supra-saturation densities, and the CREX-PREXII puzzle.

References

- [1] Gil et al., Phys. Rev. C 99 (2019) 064319
- [2] Gil et al., Phys. Rev. C 103 (2021) 034330
- [3] Jun Xu and P.P., Phys. Rev. C 105 (2022) 044305
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- [4] P.P. and Chang Ho Hyun, Symmetry 15 (2023) 683

Primary author: PPAKONSTANTINO, Panagiota (IBS / RISP)

Presenter: PPAKONSTANTINO, Panagiota (IBS / RISP)

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