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Can we improve energy density functionals? A perturbative method (remote)

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The accuracy of an energy density functional determines the accuracy of the density functional calculation. Thus, it is highly motivated to improve the accuracy of an EDF.
Then, a question arises: Can we improve an EDF if we know the "exact" density?
To answer this question, recently, we proposed a method named "IKS-DFPT" to improve the known EDF using a combination of the inverse Kohn-Sham method and the density functional perturbation theory [1]. In Ref. [1], this method was benchmarked in atomic systems, while it was extended to the covariant density funcitonal theory for nuclear systems [2].
In this talk, I will introduce this method and its benchmark results.

References:
[1] T. Naito, D. Ohashi, and H. Liang. J. Phys. B 52, 245003 (2019).
[2] G. Accorto, T. Naito, H. Liang, T. Nikšić, and D. Vretenar. Phys. Rev. C 103, 044304 (2021).

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