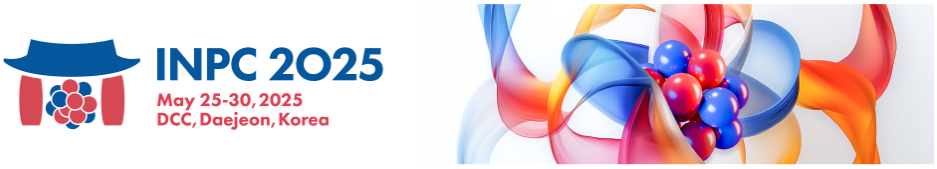


Contribution ID: **655** Type: **Invited Talk for Parallel Sessions (Invitation Only)**

# Improving nuclear Density Functional Theory: different paths

*Tuesday, 27 May 2025 08:30 (25 minutes)*

In this contribution, I will present a short, personal overview of nuclear Density Functional Theory (DFT). Compared to so-called *ab initio* approaches, DFT is more phenomenological; however, it can be applied throughout the whole isotope chart and used not only to predict ground-state properties, like masses, radii, or intrinsic deformations but also for nuclear spectroscopy. The use of DFT for excited states, like Giant Resonances, will be emphasised. Monopole resonances and dipole resonances will be discussed. The possibility of exciting some resonances exclusively using vortex photons will be mentioned.
Still, several ways to parameterise an Energy Density Functional (EDF) exist, and the path towards a "universal"EDF looks unclear. I will discuss some Bayesian inferences of EDF parameters that may lead to more "agnostic"EDFs. Then, I will advocate the need to ground DFT on *ab initio* as has been done for Coulomb systems and discuss the status and perspectives for this challenging task. Finally, I will touch upon the relationship between DFT and many-body approaches.

**Primary author:** COLÒ, Gianluca (University of Milano and INFN)

**Presenter:** COLÒ, Gianluca (University of Milano and INFN)

**Session Classification:** Parallel Session

**Track Classification:** Nuclear Structure