**European Nuclear Physics Conference 2025** 



Contribution ID: 173

Type: Invited Presentation

## Theory of nuclear matter: ab initio developments and connections to the nuclear energy functional

Infinite nuclear matter lies at the crossroads of nuclear physics investigations, as it connects the microscale of nuclei and the macroscale of compact celestial bodies. On the one hand, nuclear matter properties can be partially constrained by finite nuclei observables and astrophysical observations. On the other hand, nuclear matter can guide the development of both ab initio nuclear interactions and energy density functional (EDF) models for studying finite nuclei.

In this contribution, I will report results obtained with a newly developed ab initio Green's functions method, which provides an accurate picture of the nuclear matter equation of state and single-particle properties. Then, I will discuss the first steps and the prospects of a strategy that aims at improving the EDF approach by grounding it on the nuclear matter predictions.

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Session Classification: Plenary Session

Track Classification: Nuclear Structure, Spectroscopy and Dynamics