



Contribution ID: 340

Type: not specified

Progress in nuclear Density Functional Theory calculations: isospin and spin-isospin excitations and the link with the nuclear Equation of State

Thursday, 6 September 2018 09:00 (30 minutes)

Atomic nuclei constitute a formidable intellectual challenge for scientists who are still striving to answer the fundamental question: how do the complex nuclear phenomena emerge from the interactions between the neutrons and protons?

In this contribution, I will first give a brief survey of the status of nuclear structure theory, and emphasise the role of Density Functional Theory (DFT). After showing some applications of the most recent DFT-based approaches to selected nuclear properties, I will focus on two specific aspects.

I will discuss nuclear giant resonances, and their importance to deduce from the experiment the so-called nuclear equation of state (EoS), that is, the relationship between pressure and density in nuclear matter. A link with neutron stars will be provided.

I will also discuss the recent progress in the field of spin and spin-isospin excitations and propose some new strategy to calibrate DFT models on ab initio calculations.

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Session Classification: Plenary