



ID de Contribution: 43

Type: **Talk**

## **Nuclear structure calculations: mean-field and beyond**

*mardi 30 mai 2017 11:40 (15 minutes)*

Atomic nucleus is a quantum many-body system whose properties are determined by a number of nucleons and the interaction between them. The comprehensive theoretical framework for the description of nuclear systems should therefore be able to account for more than 3000 observed and thousands still unobserved nuclei, including their ground-state, excited-state and reaction properties. It turns out to be as complicated as it sounds. However, not everything is hopeless and significant progress has been made over the last decades. In this talk I will introduce you to basic features of one of the most successful frameworks on the market, the nuclear energy density functional theory. It is essentially a two-step process: starting from the mean-field calculation (step one), we employ the generator coordinate method (step two) in order to calculate collective properties of atomic nuclei that can then be compared to the experiment. The performance of our model will be tested in a study of neon isotopic chain structure, whose clustering properties have recently attracted both experimental and theoretical interest.

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**Classification de Session:** Nuclear physics - theory