

Proposal Acronym	NextG-DFT
Proposal Title:	Next-generation nuclear energy density functionals
Surname:	Prassa
First name(s):	Vaia
Research area:	Physics PHY
Sub-discipline of research area:	Fundamental Constituents of Matter/Nuclear physics
Category of research:	basic
[REDACTED]	[REDACTED]
Abstract:	<p>The theoretical framework of Density Functional Theory (DFT), one of the most popular and successful ab initio approaches to the structure of quantum many-body systems - atoms, molecules and solids, will be extended and applied to equilibrium and decay properties of atomic nuclei away from the stability line. The principal goal is the formulation, modeling and application of a controlled ladder of approximations for the most important ingredient of a nuclear energy density functional (EDF) - the exchange-correlation functional. The resulting semi-empirical EDF will be used to describe phenomena related to the evolution of shell structures in medium-heavy and heavy nuclei far from stability, and to investigate the island of stability and structure properties, of superheavy nuclei. Accurate and efficient computational algorithms will be devised, and studies of shape coexistence phenomena and quantum shape/phase transitions performed.</p>
Does this proposal possess any of the sensitive ethical issues detailed in ethical issues table?:	No