

## PhD position in theoretical nuclear physics

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### Unified theory of nuclear structure and reactions in the open quantum system framework

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Light weakly bound or resonant nuclei play an important role in various stellar processes of nucleosynthesis. The comprehensive understanding of these nuclei requires a correct treatment of the multi-particle continuum. It is proposed to study various structural and reaction effects of the coupling between discrete and continuum states using the Gamow Shell Model. This model provides the first unitary formulation of a standard nuclear shell model in the open quantum system framework for the description of well bound, weakly bound and unbound nuclear states. Gamow Shell Model in the representation of coupled reaction channels provides also the unified description of nuclear structure and low-energy reactions. In this thesis, the emphasis will be put on the studies of spectra and low-energy reactions of astrophysical interest, as well as the formation of near-threshold narrow resonances which are impacted by the nearby decay threshold and play crucial role in the nucleosynthesis of heavier elements in the periodic table.

#### Expected skills:

Good knowledge of quantum mechanics, nuclear physics and computational aspects of the nuclear many-body problem. Excellent skills in computing and numerical analysis.

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