Contribution ID: **127**

Type: **Talk**

Ab Initio Calculations of Light Hypernuclei

Thursday 5 September 2019 09:35 (35 minutes)

While atomic nuclei are believed to be understood in terms of dynamics between pions and nucleons, it is unclear whether these constituents are the only relevant degrees of freedom in the ground state of baryonic matter. At higher densities, realized perhaps in the cores of neutron stars, hadrons with non-zero strangeness such as hyperons are expected to appear. Strangeness nuclear physics and the study of hypernuclei are in the center of the scientific endeavor to address such questions. Hypernuclei provide important information on hyperon-nucleon interaction and, at the same time, serve as laboratories to test fundamental symmetries of nature.

Over the past decade, first-principles description of nuclear structure has seen a remarkable progress driven by advances in computational techniques to solve the nuclear many-body problem and developments of realistic Hamiltonians derived from effective field theories. As a result, accurate calculations are now possible for a wide range of hypernuclei and observables. In this contribution I will present recent developments in ab initio no-core shell model calculations of of light hypernuclei [1,nbsp;2] and report on their selected applications as for example to study charge-symmetry breaking in mirror hypernuclei [3] and pi-mesonic decay of the hypertriton. Moreover, I will discuss our very recent quantification of theoretical uncertainties of hypernuclear observables resulting from the remaining freedom in the construction of nuclear interactions.

[1] R. Wirth, D. Gazda, P. Navrátil, A. Calci, J. Langhammer and R. Roth, Ab Initio Description of p-Shell Hypernuclei, Phys. Rev. Lett. 113, 192502 (2014).

[2] R. Wirth, D. Gazda, P. Navrátil and R. Roth, Hypernuclear No-Core Shell Model, Phys. Rev. C 97, 064315 (2018).

[3] D. Gazda and A. Gal, Ab initio Calculations of Charge Symmetry Breaking in the A = 4 Hypernuclei, Phys. Rev. Lett. 116 122501 (2016).

Author: Dr GAZDA, Daniel (Nuclear Physics Institute of the CAS)

Presenter: Dr GAZDA, Daniel (Nuclear Physics Institute of the CAS)

Session Classification: Plenary Session 1 Thursday

Track Classification: Plenary