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Strange baryons in nuclei and neutron stars

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Understanding the dynamics of hadrons with strangeness has received a lot attention over the past decades in connection with the study of exotic atoms, the analysis of strangeness production and propagation in particle and nuclear research facilities, and the investigation of the possible strange phases in the interior of neutron stars. One venue of interest in the field of strangeness is the study of strange baryons, the so-called hyperons, and their dynamics with nucleons and nuclear matter. Theoretical studies have gone hand in hand with scattering experiments employing secondary hyperon beams or, more recently, using femtoscopy techniques. Also, the possible formation of nuclei with one or more hyperons inside the nucleus, the so-called hypernuclei, has triggered a lot of theoretical advances. Moreover, understanding the behaviour of hyperons in the presence of a surrounding dense medium is of particular interest to determine the features of the possible phases of dense matter in compact astrophysical objects, such as neutron stars. In this talk I will review the dynamics of hyperons with nucleons and nuclear matter, as presented in Ref. [1], paying a special attention to hypernuclei. I will also discuss the presence of hyperons in the inner core of neutron stars and the consequences for the structure of these compact stars.

[1] Laura Tolos and Laura Fabbietti, Prog. Part. Nucl. Phys. 112 (2020) 103770, 2002.09223 [nucl-ex]

Collaboration

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