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Probing the equation of state of dense matter with neutron stars: constraints from nuclear physics

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Neutron stars are unique laboratories to probe matter in extreme conditions that cannot be currently reproduced on Earth. Nuclear physics experiments, in tandem with astrophysical observations, can give valuable insight into the properties of dense matter encountered in these stellar objects.

In this contribution, various constraints on the equation of state of dense matter will be discussed, focusing on those coming from nuclear physics. In particular, these constraints include atomic masses, the analysis of experimental data from heavy-ion collisions, neutron skins in nuclei, dipole polarizability measurements, as well as microscopic calculations of homogeneous neutron matter and symmetric nuclear matter.
The prediction of neutron-star observables obtained with different equations of state will be discussed in connection with recent (multi-messenger) astrophysical observations.

Affiliation de l'auteur principal

Grand Accélérateur National d'Ions Lourds (GANIL), CEA/DRF - CNRS/IN2P3, Boulevard Henri Becquerel, 14076 Caen, France

Auteur principal: FANTINA, Anthea Francesca (Grand Accélérateur National d'Ions Lourds (GANIL))

Orateur: FANTINA, Anthea Francesca (Grand Accélérateur National d'Ions Lourds (GANIL))

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