

The interplay between neutron stars and particle physics

Neutron stars are very dense cold objects, with a baryon density at the centre that can reach up to 10 times saturation density. Its properties macroscopic properties could, therefore, probe the high density, low temperature and very isospin asymmetric region of the QCD phase diagram. Questions like: does the composition of neutron stars include hyperons, delta baryons, kaon condensates, a core of deconfined quarks possibly in a superconducting phase are still open and the interplay between lab measurements and neutron star observations will certainly help clarify these questions. Also the warm low density matter formed in core-collapse supernova and binary neutron star mergers require information from the lab: what is the fraction of light clusters or hyperclusters? Are heavy baryons also present? This information is important to understand the transport properties of the NS crust, which affect, for instance, timing properties of X-ray pulsars. It will be discussed how some of the particle information affects the neutron star properties.

Constança Providência
CFisUC, Universidade de Coimbra