Contribution ID: **231** Type: **Poster**

Quark deconfinement in compact stars through sexaquark condensation *

Tuesday 14 June 2022 17:14 (5 minutes)

In this contribution, we present for the first time a scenario according to which early quark deconfinement in compact stars is triggered by the Bose-Einstein condensation (BEC) of a light sexaquark (S) with a mass $m_S < 2054$ MeV, that has been suggested as a candidate particle to explain the baryonic dark matter in the Universe. The onset of S BEC marks the maximum mass of hadronic neutron stars and it occurs when the condition for the baryon chemical potential $_B = m_S/2$ is fulfilled in the center of the star, corresponding to $M_{onset} \leq 0.7 M_\odot$. In the gravitational field of the star the density of the BEC of the S increases until a new state of the matter is attained, where each of the S-states got dissociated into a triplet of color-flavor-locked (CFL) diquark states. These diquarks are the Cooper pairs in the color superconducting CFL phase of quark matter, so that the developed scenario corresponds to a Bose-Einstein condensation - Bardeen-Cooper-Schrieffer (BEC-BCS) transition in strongly interacting matter. For the description of the CFL phase, we develop here for the first time the three-flavor extension of the density-functional formulation of a chirally symmetric Lagrangian model of quark matter where confining properties are encoded in a divergence of the scalar self-energy at low densities and temperatures.

- Contribution to the Book "New Phenomena and New States of Matter in the Universe. From Quarks to Cosmos" edited by C. A. Z. Vasconcellos, P. O. Hess and T. Boller.

Present via

Authors: BLASCHKE, David; SHAHRBAF, Mahboubeh; IVANYTSKYI, Oleksii (University of Wroclaw)

Presenter: IVANYTSKYI, Oleksii (University of Wroclaw)

Session Classification: Poster

Track Classification: Bulk matter phenomena, QCD phase diagram, and Critical point