
Contribution ID: **259** Type: **Contributed e-poster**

# Hybrid compact stars with a crossover equation of state

*Monday, 8 July 2024 16:00 (30 minutes)*

Similar to the crossover phase transition in lattice QCD, at high temperature and small baryon chemical potential, recently, the structure of neutron stars have been studied with a crossover equation of state to model a smooth transition from a pure neutron matter to massless quarks [1]. The switch function, that guides the crossover, was constrained in order to reproduce neutron stars up to about two solar masses. Afterwards, such a study has been extended by considering the relevance of color superconducting massless quarks in the cold dense matter [2]. In this contribution, we investigate the hadron to quark crossover transition by means of an equation of state which incorporates hadronic matter, composed by nucleons, hyperons and $\Delta$-isobars, unpaired quark matter with massive strange quarks, including first-order $\alpha_s$ strong interaction, and the possibility of a color-flavor locking phase. The beta-stability and the charge neutrality result to be globally respected during the crossover with the inclusion of the leptons degrees of freedom. In this framework, we analyze the role of the strangeness content related to the bulk properties of the compact star.

[1] J.I. Kapusta, T. Welle, Phys. Rev. C 104, L012801 (2021)
[2] D. Blaschke, E.-O. Hanu, S. Liebing, Phys. Rev. C 105, 035804 (2022)

## session

H. Equation of State and Neutron Stars

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**Session Classification:** Poster session