Contribution ID: **16** Type: **not specified**

Exotic Baryons in (Hot) Neutron Stars

Tuesday 20 June 2023 14:00 (40 minutes)

This presentation will provide an overview of two research papers. The first paper focuses on the calculation of baryon-meson coupling constants for spin-1/2 baryonic octet and spin-3/2 decuplet using symmetry arguments based on SU(3) and SU(6) group transformations. The coupling constants are determined by reproducing known potential depths for hyperons and Δ resonances. These constants are then applied to study neutron star matter with hyperons and deltas. The findings reveal that the Δ− particle is crucial in the neutron star interior, consistently appearing and impacting the astrophysical properties, potentially increasing the maximum mass reached. The second paper investigates the nuclear isentropic equation of state for stellar matter composed of nucleons, hyperons, and Δ-resonances in different stages of a neutron star's evolution. A relativistic model within the mean-field approximation is used, along with density-dependent couplings adjusted by the DDME2 parameterization. Baryon-meson couplings are determined based on SU(6) and SU(3) symmetry arguments. The dominant exotic particle in the star is found to be Λ at different entropies for both neutrino-free and neutrino-trapped stellar matter. The inclusion of new particles leads to a decrease in temperature, and increasing entropy per baryon results in larger stellar radii and lower mass due to neutrino diffusion. In neutrino transparent matter, radii decrease with entropy per baryon without significant changes in stellar mass.

Presenter: MARQUEZ, Kauan (Departamento de Física, CFM, Universidade Federal de Santa Catarina Florianópolis, CP 476, Santa Catarina 88040-900, Brazil)