

Contribution ID : **223** Type : **Short communications**

Holographic QCD and Neutron Stars

The AdS/CFT correspondence establishes that, in the large-N_c limit and for strong 't Hooft coupling, the $\mathcal{N} = 4$ Super Yang–Mills (SYM) theory admits a holographic description in terms of classical type IIB supergravity on an $AdS_5 \times S^5$ geometry. Within this framework, we review the top-down holographic D3-D7 model, which incorporates flavor degrees of freedom through D7-branes and is used to study quark matter at zero temperature and high baryon density, associated with the deconfined phase.

On this basis, results of the D3-D7 model for $N_c = N_f = 3$ are reviewed, aiming to establish a connection with Quantum Chromodynamics (QCD). The zero-temperature holographic equation of state (EoS) derived from the D3-D7 system is considered, and a hybrid approach is adopted, matching this holographic EoS with nuclear matter equations of state obtained from chiral effective theory (CET) extrapolations, particularly the Hebeler–Lattimer–Pethick–Schwenk (HLPS) soft, intermediate, and hard equations of state, valid at low densities.

The matching is performed at an intermediate density determined by the equal-pressure condition, defining an effective transition between nuclear and quark matter. From these hybrid equations of state, the Tolman–Oppenheimer–Volkoff (TOV) equations are solved, obtaining neutron star mass–radius relations.

Primary author(s) : Mr BENIQUE SARAYASI, Luis Fernando (Universidade Federal do Rio de Janeiro (UFRJ))

Presenter(s) : Mr BENIQUE SARAYASI, Luis Fernando (Universidade Federal do Rio de Janeiro (UFRJ))

Session Classification : ASTROFISICA Y CIENCIAS ESPACIALES