Contribution ID: **35** Type: **not specified**

# Neutron star properteis constrained by the chiral effective field theory and astrophysical observations

Chiral effective field theory has played a significant role in exploring nuclear structure and the properties of nuclear matter. It has now become foundational in understanding various nuclear phenomena. However, the theory's applicability to the nuclear matter equation of state (EOS) is limited at densities exceeding twice nuclear saturation density due to its inherent cutoff dependence. Observational data from neutron stars, such as tidal deformabilities and constraints on mass and radius, can help extend these limits. In this presentation, we provide statistical results for neutron star characteristics —such as maximum mass, mass-radius relationship, proton fraction, and speed of sound using a nuclear energy density functional constrained by chiral effective field theory and astrophysical observations. Additionally, we discuss potential improvements to the nuclear EOS for dense nuclear matter.

**Author:** LIM, Yeunhwan (Yonsei University)

**Track Classification:** 5. Baryon rich QCD matter, nuclear astrophysics