



東北大学 宇宙創成物理学国際共同大学院プログラム

GP-PU (Graduate Program on Physics for the Universe) Seminar

# “Nuclear equation of state and its applications to astrophysical compact objects”

by Hajime Togashi (Tohoku University)

Date: 16:00-18:00 July 7<sup>th</sup>, 2021

Registration: <https://us02web.zoom.us/meeting/register/tZAqceqrqDojGNc7ByaxilimPX3O3HFA07kP>

## ▶ Abstract

The equation of state (EOS) for infinite nuclear matter plays important roles in the studies of astrophysical compact objects such as neutron stars and core-collapse supernovae. Since extremely high densities exist in these compact objects, great efforts have been devoted to understand the EOS for dense matter from terrestrial experiments, astrophysical observations, and theoretical calculations. In particular, because the stiffness of nuclear matter is governed by the repulsion of nuclear forces, the reliable EOS should be described by the microscopic many-body theory with bare nuclear Hamiltonian.

In this seminar, I will review the current understanding of microscopic EOSs based on the realistic nuclear forces and report on a newly proposed EOS with the variational many-body theory. This EOS has been constructed for use in numerical simulations of astrophysical phenomena. Therefore, in the latter part of this talk, I will show some applications of the EOS to astrophysical simulations and discuss the EOS effects on the mechanism of core-collapse supernovae and structure of neutron stars.

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