Contribution ID: **71** Type: **not specified**

The Effect of Isovector Scalar Meson on Neutron Star Matter Based on a Parity Doublet Model

Monday, October 7, 2024 3:52 PM (12 minutes)

We study the effect of the isovector-scalar meson (980) on the properties of nuclear matter and the neutron star (NS) matter by constructing a parity doublet model with including the meson based on the chiral SU(2)L x SU(2)_R symmetry. We also include the - mixing contribution to adjust the slope parameter at the saturation. We find that, when the chiral invariant mass of nucleon is smaller than about 800 MeV, the existence of (980) enlarges the symmetry energy by strengthening the repulsive meson coupling. On the other hand, for large where the Yukawa coupling of (980) to nucleon is small, the symmetry energy is reduced by the effect of omega-rho mixing. We then construct the equation of state (EoS) of a neutron star matter to obtain the mass-radius relation of NS. We find that, in most choices of , the existence of (980) stiffens the EoS and makes the radius of NS larger. We then constrain the chiral invariant mass of nucleon from the observational data of NS, and find that 580 < m_0 < 860 MeV for L0 = 57.7 MeV.

Presenter: KONG, Yuk Kei (Nagoya University)