

Investigation of the rotation effects on high density matter in hybrid stars

Tuesday, 26 August 2014 15:20 (20 minutes)

The equation of state (EOS) for the high density matter is still not clear and recent several observations indicate the restrictions of the EOSs, therefore theoretical studies should try to elucidate the EOSs in the high density and/or temperature. As there are many rapidly rotating neutron stars (pulsars), many theoretical studies try to take into account the effect of rotation[1]. We accordingly also try to take into account the effects of rotation in our study[2]. Then we find that our EOS is consistent with these observations[3]. We also see an important relation between radius and rotation. Ordinarily, the “radius” of the star is single-valued because we consider that the star is spherical. However, if the star is rapidly rotating, we have to pay attention to the different “radii”. Because of the effect of the rotation, a star deforms from a sphere to an ellipse. Therefore, we introduce two values, R_{eq} and R_p , which are the “equatorial radius” and the “polar radius”, respectively. If the rotation rate is 400 Hz or faster, the two radii are different. Therefore, we have to note the effects of rotation on rapidly rotating stars.

References:

- [1] A. Kurkela et al., arXiv:1006.4062[astro-ph.HE].
- [2] T. Endo, Phys. Rev. C 83, 068801 (2011).
- [3] T. Endo, arXiv:1310.0913[astro-ph.HE].

Primary author: Prof. ENDO, Tomoki (Kagawa National College of Technology)

Presenter: Prof. ENDO, Tomoki (Kagawa National College of Technology)

Session Classification: Nuclear and particle astrophysics

Track Classification: 5) Nuclear and particle astrophysics