

Rossby wave instability in proto-neutron stars

*Takiwaki Tomoya¹

1. National Astronomical Observatory of Japan

Core-collapse supernovae are catastrophic death of massive stars. The iron-core inside the star implodes and becomes the proto-neutron star. The released gravitational energy is transported by neutrino and blows off the outer layers. This basic mechanism is basically confirmed by massively paralleled simulations though the simulations cannot perfectly reproduce the observed supernovae. Our next target is the diversity of core-collapse supernovae. The stars are characterized by mass, metallicity, rotation, magnetic fields, and binarity. We expect that these characters alter star's gravitational collapse and explosion. In this talk, we focus on the rapidly rotating core and proto-neutron star that is deformed by Rossby wave instability. We discuss the role of the instability, effect on the explosion mechanism, emission of neutrino, and gravitational waves. The results have been summarized in Takiwaki et al. 2016, 2018, and 2021.

Keywords: stars, convection, Rossby wave