Asymmetric neutrino transport in strong toroidal magnetic field

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Abstract

We investigate the effect of asymmetric neutrino transport on the rotation of proto-neutron star under the strong troidal magnetic field. Most of the gravitational energy during the supernova explosion is carried away by neutrino, and it influences many physical properties of the system. We pointed out a possible connection between asymmetric neutrino emission and pulsar-kick with the poloidal magnetic field[1]. In this poster we present our recent result based on the toroidal magnetic field inside the proto-neutron star. As well as the case of pulsar-kick, asymmetric neutrino emission causes a torque on the proto-neutron star and decelerates its rotation. We estimate this spin-deceleration and show it is considerably effective compared to that of the ordinary magnetic dipole radiation mechanism.

[1]. T. Maruyama et al., astro-ph/arXiv:1201.3455