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Rapid Spin-Deceleration through Asymmetric Neutrino Emission in Magnetized Proto-Neutron Stars

We estimate the maximum possible contribution to the early spin deceleration of proto-neutron stars due to asymmetric neutrino absorption under the strong magnetic field. We calculate the neutrino reaction in the context of a fully relativistic mean field theory and estimate the spin deceleration of neutron stars due to asymmetric neutrino absorption in a toroidal magnetic field configuration. We find the deceleration can be much larger for asymmetric neutrino absorption in a toroidal magnetic field than the braking due to magnetic dipole radiation.

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