Kicks of magnetized strange quark stars as a consequence of anisotropic emission of neutrinos

Dr. Aurora Perez Martinez, Instituto de Cibernética Matemática y Física, Havana, Cuba

Abstract: We study the anisotropic neutrino emission from the core of neutron stars induced by the stars' magnetic field. We model the core as made out of a magnetized ideal gas of strange quark matter and implement the conditions for stellar equilibrium in this environment. The calculation is performed without resorting to analytical simplifications; and for temperature, density and magnetic field values corresponding to typical conditions for a neutron star's evolution. The anisotropic neutrino emission produces a rocket effect that contributes to the star's kick velocity. We find that the computed values for the kick velocity lie within the range of the observed values, reaching velocities of the order of
1000 km/s for magnetic fields between 10^15 - 10^18 G and radii of 20 to 5 km, respectively.