Contribution ID: **18** Type: **not specified**

Anisotropic systems of Fermions: gravitational equilibrium and dynamic stability

Wednesday, 14 May 2014 15:00 (30 minutes)

Systems of selfgravitating Fermions constitute a topic of great interest in astrophysics, due to the wide range of applications, and are used also to explain dark matter in galaxies and clusters of galaxies. Here, we study the gravitational equilibrium of spherical models describing a semidegenerate collisionless gas. The Fermi-Dirac distribution function, modified by a cutoff term in order to avoid infinite solutions in mass and radius, is multiplied by an anisotropic term, depending on the angular momentum, evidencing the prevalence of tangential motion of the particles. The starting point is solving the equations of the gravitational equilibrium (both in Newtonian and General Relativistic regime) and analyzing the behavior of the matter density through the calculation of the components of the pressure tensor. We have extended the analysis in the classical regime and in the fully degenerate limit, considering also the problem of the dynamic stability. By solving the equation of the small oscillations for anisotropic systems, new expressions for the critical value of the polytropic exponent are derived, both in Newtonian and General Relativistic regime.

Presenter: ALBERTI, Giuseppe (Univ.Roma1)

Session Classification: Part 3