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Relativistic systems of Fermions with anisotropy and cutoff energy in their distribution function

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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 in 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 from non-quantum regime to fully degenerate limit, and we considered also the limits on the mass of particles composing the system.

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