Superfluid stars

Contributed Talk //

Astro-Particle Physics

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Logarithmic fluid models find applications in a theory of superfluidity, where they take into account multiple-body interactions (3+) and vacuum effects. Naturally, they can be used in the models of cold dense stars in relativistic astrophysics, where high densities create conditions for superfluidity. We demonstrate the existence of equilibria in self-gravitating logarithmic fluid, described by spherically symmetric nonsingular finite-mass asymptotically-flat solutions in general relativity. Unlike other boson star models known to date, equilibrium configurations of relativistic logarithmic fluids are shown not to have scale bounds for their gravitational mass or size. Therefore, they can describe large massive dense astronomical objects, such as bosonized superfluid stars or cores of neutron stars.

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