

Equations of boson-fermion star and the basic equation discussions under Newtonian approximation

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There is accumulating evidence that scalar fields may exist in nature. The gravitational collapse of a boson cloud would lead to the formation of a boson star just like white dwarfs and neutron star. In generally, as one of candidates of dark matter, a boson star holds a stable configuration and has deserved intensive attention and extensive researches in the past 50 years. At first, we examined the properties of a complex-scalar-field boson star, and analyze the ground state solutions, then analyzed the configuration of a star composed of bosons and fermions, and gave coupling equations. At last, we considered the hydrostatic equilibrium equation of the boson-fermion star, and gave the virial equation with different orders and investigated how scale fields impact the virial equation.

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