Ground States for Mass Critical Two Coupled Semi-Relativistic Hartree Equations with Attractive Interactions

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Abstract

We prove the existence and nonexistence of $L^2(\mathbb{R}^3)$ -normalized solutions of two coupled semi-relativistic Hartree equations, which arisen from the studies of boson stars and multi-component Bose–Einstein condensates. Under certain condition on the strength of intra-specie and inter-specie interactions, by proving some delicate energy estimates, we give a precise description on the concentration behavior of ground state solutions of the system. Furthermore, an optimal blowing up rate for the ground state solutions of the system is also proved.

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