Existence and stability of stationary solutions to the compressible quantum model

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Abstract

In this paper, the compressible quantum model with the given mass source and the external force of general form in three-dimensional whole space is considered. Based on the weighted L^2 method and L^∞ estimates, the existence and uniqueness of stationary solutions can be obtained by the contraction mapping principle. By using a general energy method, the nonlinear stability of stationary solutions is studied, and the time decay rates of the solutions are established when the initial perturbation belongs to $\dot{H}^{-s}$ with $0 \leq s < \frac{3}{2}$.

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