

Abstract Submitted
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Relaxation times for Bose-Einstein condensation in axion mini-clusters ANTHONY E. MIRASOLA, KAY KIRKPATRICK, University of Illinois at Urbana-Champaign, CHANDA PRESCOD-WEINSTEIN, University of New Hampshire — Axions and other scalar dark matter in gravitationally bound miniclusters or dark matter halos are expected to condense into Bose-Einstein condensates called Bose stars. This process has been shown to occur either through attractive self-interactions of the axion-like particles or through the field's self gravitation. We show that in the high-occupancy regime of scalar dark matter, the Boltzmann collision integral does not describe either gravitational or self-interactions, and derive kinetic equations valid for both these interactions. We use this formalism to compute relaxation times for the Bose-Einstein condensation, and find that condensation into Bose stars could occur within the lifetime of the universe. The self-interactions reduce the condensation time only when they are very strong.

Anthony E. Mirasola
University of Illinois at Urbana-Champaign

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