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Axion Stars and Bose-Einstein Condensate Dark Matter

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The idea that light, self-interacting scalars (e.g. axions) comprise a major component of Dark Matter has recently received renewed interest. It has been shown previously not only that macroscopic bound states of such particles can exist in a Bose-Einstein Condensed phase, but also that this can have unique consequences in astrophysical or terrestrial detection experiments. We present a novel expansion method for integrating the equations of motion for bound states of axion-like particles, which is valid in a wide range of parameter space. This method makes clear the limitations of the procedure widely used in the literature, and also gives a clear physical interpretation of the maximal mass of these axion stars. We briefly discuss some possible astrophysical constraints and detection signatures.

Oral or Poster Presentation

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