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Bose-Einstein Condensation of Dark Matter Axions

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It was found recently that dark matter axions thermalize and form a Bose-Einstein condensate (BEC). This provides an opportunity to distinguish axions from other forms of dark matter on observational grounds. I'll show that if the dark matter is axions, tidal torque theory predicts a specific structure for the phase space distribution of the halos of isolated disk galaxies, such as the Milky Way. This phase space structure is precisely that of the caustic ring model, for which observational support has been found earlier. The other dark matter candidates predict a different phase space structure for galactic halos. These findings imply that the dark matter is axions.

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