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Axions and ALPs: a very short introduction

Tuesday 16 May 2017 09:00 (35 minutes)

Axions were originally predicted as a dynamical solution to the strong CP problem. Axion like particles are also a generic prediction of many high energy physics models including string theory. Theoretical models for axions are reviewed, giving a generic multi-axion action with couplings to the standard model. Axion cosmology motivates the existence of several distinct populations of axions behaving as coherent condensates, or relativistic particles. Light, stable axions are a mainstay dark matter candidate. Axions can also contribute to the dark energy density and provide natural inflaton candidates. Axions can also be produced in the lab as virtual particles (force-mediators) or directly, and can contribute to stellar cooling. Constraints on axions from the well-known photon coupling, as well as other portals, are briefly reviewed, including model-independent gravitational constraints. Finally, axions and the "fuzzy DM"model are briefly discussed.

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