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Axions and stars: bounds, hints and experimental potential

Monday 18 June 2018 10:20 (20 minutes)

Stars are extremely powerful laboratories for light, weakly interacting particles. In this talk, I will give an overview of stellar bounds and hints on axions and axion like particles. In particular, I will review what we can learn from the evolution of white dwarfs, red giant and horizontal branch stars, and supernovae. I will discuss some new studies and recent advances on supernovae and red giant stars and show the hinted areas in the axion/ALP parameter space. Finally, I will consider the experimental potential to probe these areas, focusing not only on experiments sensitive to the axion-photon coupling (such as IAXO and ALPS) but to instruments sensitive to the axion coupling to other standard model fields. Some recent topics related to stellar axions, in particular their impact on the mass threshold for Carbon ignition or the problem of direct detection of supernova axions, will not be considered in this talk and will be discussed elsewhere in this workshop (see presentations by I. Dominguez and A. Mirizzi).

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