

AXION-LIKE PARTICLES IN GRAVITATION, ASTROPHYSICS AND COSMOLOGY

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We discuss axions and axion-like particles, predicted in many extensions of the Standard Model, and rapidly progressing field of axion gravitation, astrophysics and cosmology. At the moment, axions are considered as leading candidates to compose the missing matter of the Universe. Due to their coupling to photons, electrons and nucleons, axions should be emitted by stars, black holes, supernovae, and play an important role in inflationary cosmology. Taken together, these areas allow searching for axions and obtaining constraints on their parameters. Here we present the strongest constraints on axion-like particles obtained from astrophysics and cosmology, as well as from various laboratory experiments, and discuss the prospects for their detection.