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Astrophysical Searches of Ultralight Particles

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The Standard Model (SM) of particle physics is a very successful theory that can explain the fundamental particles and their interactions. However, there are theoretical, and experimental motivations of studying physics Beyond Standard Model. I will discuss the possibility of probing Beyond Standard Model physics through light particles like axions and light gauge bosons. We also obtain bounds on the properties of these particles from astrophysical experiments. The constraints on ultralight axions are derived from indirect evidence of gravitational waves, birefringence phenomena, gravitational light bending, and Shapiro time delay. These ultralight axions can also be a promising candidate for dark matter. We also explore the contribution from ultralight gauge bosons to the orbital period loss of compact binary systems, and perihelion precession of planets and obtain constraints on the mass and coupling strength of these particles. Such types of observations can also constrain several particle physics models and will be discussed.

In-person participation

Yes

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