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Photon-ALP oscillations at TeV energies

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Axion and axion-like-particles (ALPs) are well motivated cold dark matter candidates. Nevertheless, an astoundingly huge parameter space remains unexplored despite much effort, ranging from fuzzy dark matter at $m_a \sim 10^{-22}$ eV to light dark matter at $m_a \sim$ keV. Most experimental ALP searches rely on the characteristic two-photon-ALP coupling. This coupling has a number of interesting observational consequences, such as a mixing between photon and ALPs when the photon propagates through an external magnetic field. In this talk, we discuss the signatures that ALPs imprint on high energy photon spectra from astrophysical sources due to photon-ALP oscillations. In particular, we present a model independent statistical test designed to search for these signatures and that may improve current experimental sensitivities significantly. The focus is on photon energies relevant for the upcoming Cherenkov Telescope Array (CTA) and on oscillations in extragalactic magnetic fields.

In-person participation

Yes

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