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CTAO sensitivity to axion-like particles

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Axion-like particles (ALPs) are a common feature in several extensions of the Standard Model, arising, for example, as a solution to the strong CP problem in quantum chromodynamics, or as a prediction of string theories. A significant property for the experimental detection of ALPs is their coupling to photons, which enables ALP-photon conversions in ambient magnetic fields.

In particular, gamma-ray photons could convert into ALPs in the magnetic fields of distant objects and then reconvert in the Milky Way's magnetic field. By eluding absorption by the extragalactic background light (EBL), such a mechanism could produce a hardening in the gamma-ray spectra of these sources. I investigate the capability of the Cherenkov Telescope Array Observatory (CTAO) to detect signals of ALP-photon conversions in the very-high-energy spectra of known blazars at energies above 10 TeV, comparing different magnetic field scenarios.

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