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## Search for gamma rays from cosmic-ray scattering off axion-like particles in the Milky Way dark matter halo

In the context of Indirect dark matter (DM) detection, we investigate the scenario of an Axion-like particle (ALP) model, a prime model candidate for DM where their non-thermal production can provide the correct DM density. Beyond their implications in different astrophysical phenomena, if DM is mostly made of ALPs, the Milky Way would be one of the main sources for ALP searches. We investigate the ALP couplings to photons and electrons via inverse Primakoff and Compton processes, respectively, through the search for very-high-energy gamma rays arising from high-energy cosmic-ray scattering off ALP populating the halo of the Milky Way. We show that gamma-ray ground-based observatories such CTAO and SWGO provide an alternative and complementary avenue to probe ALP couplings in the eV mass range. Sensitivities of current and near-future ground-based gamma-ray observatories significantly improves upon current constraints from gamma-ray satellite experiments for the ALP-photon couplings. Their sensitivities reached on the ALP-electron couplings allow probing lower ALP masses compared to gamma-ray satellite experiments.

## **Collaboration(s)**

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