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## Constraints on axion-like particles with the Perseus Galaxy Cluster with MAGIC

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Axion-like particles (ALPs) are a class of pseudo-Nambu-Goldstone bosons that have been proposed as potential candidates for dark matter. When propagating through astronomical environments embedded with magnetic fields, very high-energy gamma rays can convert to ALPs, modifying the spectral energy distribution of the observed target. Our study employs around 40 hours of data from the MAGIC telescopes obtained from the observations of the Perseus Galaxy Cluster, in particular, the radio galaxy NGC1275 and the high frequency peaked BL Lac object IC310. Given its proximity and strong magnetic field, which extends up to several hundreds of kpc, Perseus is a viable candidate for such a study. By searching for distinctive spectral signatures and introducing a new statistical approach to the analysis, we confirmed constraints on ALPs with masses in the  $\text{neV}-\mu\text{eV}$  range and established the most stringent limits for ALPs with masses around 40  $\text{neV}$ . Furthermore, the results of this research unveiled new prospects for performing similar studies with the new upcoming gamma-ray ground-based instruments.

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