

# Model uncertainty of axion search using ultra-high energy gamma-ray observation

*Tuesday, September 2, 2025 3:45 PM (2 hours)*

Axions are one of the candidates for dark matter in the Universe. One way to search for axions is through gamma-ray observation. If there exist axions in the Universe, gamma rays emitted from some sources can be converted into axions, vice versa, by magnetic fields in several astrophysical environments. Constraints on axion mass and its coupling to photons have been given by looking for its signal in observed gamma ray spectra. Not only extra-galactic sources but also galactic sources have been recently used for this kind of analysis, but model uncertainties were not taken into account well. In this work, we investigate their impacts on axion search and give conservative constraints on axion parameters using ultra-high energy gamma-ray observations.

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**Session Classification:** ポスター 1