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Constraining new physics with TeV gamma-rays

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In this talk, I will present the results of two recent papers that both use observations of TeV gamma-rays from blazars to constrain physics models. In the first paper, we use the flux spectra from TeV blazars to constrain the viable axion-like particle parameter space. We show that an axion-like particle that mixes with photons can lead to an overproduction in the TeV spectra of distant blazars, compared to observations. In the second paper we show that adding the blazar contribution to the isotropic gamma-ray background overproduces the observed background unless blazars have an intrinsic cutoff in their TeV spectra. However, this is in tension with local blazar data, indicating the need for a modification of current astrophysical models or new physics.

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