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Overview of Dark Photon Search at UC Davis

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Astronomical and cosmological observations have provided glimpses of physics beyond the standard model. This has motivated the creation of many experiments primarily focusing on weakly interacting massive particles (WIMPs) and supersymmetry. The lack of results from this search suggests the search for alternative candidates.[1]
The dark photon is a hypothetical low-mass vector boson born out of quantum fluctuations at the time of inflation. Its ultralight mass warrants its description as a classical field. This field would kinetically mix with the electromagnetic field setting up the possibility of detection in the lab. [2] This talk is an overview of the dark radio setup (both current and future) at UC Davis looking for this dark photon. By hanging an antenna inside a shielded room and listening over a wide swath of frequency space, we can search down to new limits on both mass and coupling strength of this hypothetical ultralight dark matter candidate.

[1] S. Chaudhuri, P. W. Graham, K. Irwin, J. Mardon, S. Rajendran, and Y. Zhao. Radio for hidden-photon dark matter detection. Phys. Rev., D92(7):075012, 2015.

[2] P. W. Graham, J. Mardon, and S. Rajendran. Vector Dark Matter from Inflationary Fluctuations. Phys. Rev., D93(10):103520, 2016.

Session

Works in Progress (15+5 min)

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