

Development of a Vacuum Ultraviolet Detector for Dark Photon Searches

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Dark photon arises as the extra gauge boson in a U(1) Standard Model extension and it couples to ordinary photon via kinetic mixing. The parameter space spans many orders of magnitude in energy and has been explored widely by terrestrial and astrophysical measurements. In this work, we focused on development of a detector system to study a narrow energy band from 7-8 eV motivated by other studies. The photons in this energy band have large absorption due to molecular oxygen where absorption length is of order of cm at atmospheric pressure, and the detection system has to be setup in vacuum or use nitrogen purging to reduce their attenuation. We constructed our detector system using low dark rate photomultipliers sensitive at these energies with aluminum reflector akin to FUNK experiment to enhance collection, and setup our experiment in a vacuum chamber. Results on performance and preliminary sensitivity will be reported.

Keywords

Dark Photon, ultra-light dark matter, vacuum ultraviolet

Collaboration

other (fill field below)

other Collaboration

Small R & D collaboration

Subcategory

Experimental Methods & Instrumentation

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