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Electron Trap as a meV Axion and Dark Photon Dark Matter Detector

Detecting axion and dark photon dark matter in the milli-eV mass range has been considered a significant challenge due to its frequency being too high for high-Q cavity resonators and too low for single-photon detectors to register. I will present a method that overcomes this difficulty (based on recent work arXiv:2208.06519) by using trapped electrons as high-Q resonators to detect axion and dark photon dark matter and set a new limit on dark photon dark matter at 148 GHz (˜0.6meV) that is around 75 times better than previous constraints by a 7 days proof-of-principle measurement. I will also propose some updates to this work that greatly improve the result by optimizing some of the experimental parameters and techniques.

Authors: XIAO, Yawen; GRAHAM, Peter; GABRIELSE, Gerald (Harvard University); RAMANI, Harikrishnan; FAN, Xing; Mr WONG, Samuel (Stanford University)

Presenter: XIAO, Yawen