

Electron Trap as Dark Matter Detector

Wednesday, 10 July 2024 15:00 (20 minutes)

Ultralight dark matter, such as axion and dark photon, in the milli-eV mass range, is notoriously difficult to detect. It is too high in frequency for high- Q cavity resonators yet below the energy threshold of single-photon detectors. Our recent work (arXiv:2208.06519) showed that the cyclotron motion of trapped electrons can resonantly couple to dark photon and provide a powerful probe of this mass range. The effect is enhanced by the geometric focusing of a spherical cavity. We demonstrated the method is background-free over a 7-day period. I will also present some new ideas for improving this method and modifying it to search for axion.

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Session Classification: Parallel 3

Track Classification: Parallel session: Axion/Sterile