

Detecting Quadratically Coupled Ultra-light Dark Matter with Stimulated Annihilation

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Ultra-light Dark Matter (ULDM) is one of the most promising DM candidates. Due to the Bose enhancement, we find the annihilation rate of the ULDM in the presence of background photon radiation can be greatly enhanced and produce a distinctive reflected electromagnetic wave with an angular frequency equal to the ULDM mass. We propose to utilize such stimulated annihilation to probe the ULDM with the electromagnetic quadratic coupling by emitting a beam of radio into space. With a power of 50 MW emitter, we forecast the sensitivity of quadratic coupling in different local halo models for low-frequency radio telescopes, such as LOFAR, UTR-2 and ngLOBO.

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