

GALILEO: Galactic Axion Laser Interferometer Leveraging Electro-Optics

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We introduce GALILEO, a novel experimental approach to detect light dark matter candidates through precision optical interferometry. The method exploits the sensitivity of electro-optical materials, whose refractive indices are modulated by a coherently oscillating dark matter field. Using a high-precision resonant Michelson interferometer as the detection mechanism, GALILEO enables the exploration of uncharted parameter space for light dark matter, including dark photons and axion-like particles, across a broad mass range. Notably, the experiment achieves sensitivity to dark matter masses exceeding tens of microelectronvolts—a challenging regime for conventional microwave cavity haloscopes.

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