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A Proposal to Detect Dark Matter Using Topological Insulators

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Antiferromagnetically doped topological insulators (A-TI) are among the candidates to host dynamical axion fields and axion-polaritons; weakly interacting quasiparticles that are analogous to the dark axion, a long sought after candidate dark matter particle. Here we demonstrate that using the axion quasiparticle and antiferromagnetic fluctuations in A-TI's in conjunction with low-noise methods of detecting THz photons presents a viable route to detect axion dark matter with mass 0.7 to 3.5 meV, a range currently inaccessible to other dark matter detection experiments and proposals.

Primary author: Dr MARSH, David (University of Goettingen)

Presenter: Dr MARSH, David (University of Goettingen)

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