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Experimental Signatures of Ultra-Light Dark Matter

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Observational limits on the mass of dark matter are weak —they allow the mass of dark matter to be anywhere from 10^{-22} eV –10^{48} GeV. In this talk, I will focus on ultra-light dark matter in the mass range 10^{-22} eV – 10^{-5} eV. A number of well motivated dark matter candidates such as axions inhabit this vast parameter space. Even though these candidates emerge from a number of models, there are only four possible experimental signatures of these models: they can drive currents in circuits, lead to spin precession, exert forces on particles, and change the values of fundamental constants. All of these effects can be experimentally probed using precision magnetometry and interferometry.

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