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ABRACADABRA, A Search for Low-Mass Axion Dark Matter

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ABRACADABRA is a proposed experiment to search for ultralight (10e-14 - 10e-6 eV) axion dark matter. When ultralight axion dark matter encounters a static magnetic field, it sources an effective electric
current that follows the magnetic field lines and oscillates at the axion Compton frequency. In the presence of axion dark matter, a large toroidal magnet will act like an oscillating current ring, whose induced magnetic flux can be measured by an external pickup loop inductively coupled to a SQUID magnetometer. The readout circuit can be broadband or resonant and both are considered. ABRACADABRA is fielding a 10-cm prototype in 2017 with the intention of scaling to a 1-m^3 experiment. The long term goal is to probe QCD axions near the GUT-scale. In this talk I will review the design, sources of noise, and sensitivity of the experiment. I will also discuss the proposed 10-cm prototype.

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