

ABRACADABRA: A New Approach to the Search for Axion Dark Matter

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The evidence for the existence of dark matter is well supported by many cosmological observations. Separately, long standing problems within the Standard Model point to new weakly interacting particles to help explain away unnatural fine-tunings. The axion was originally proposed to explain the strong CP problem, but was subsequently shown to be a strong candidate for explaining the Dark Matter abundance of the Universe. ABRACADABRA is a proposed experiment to search for ultralight axion Dark Matter, with a focus on the mass range $10^{-14} < m_a < 10^{-6}$ eV. We search for these axions and other axion-like particles (ALPs) through a modification to Maxwell's equations, which cause strong magnetic fields to source weak oscillating electrical currents parallel to the field. In this talk, I will describe the working principle behind the ABRACADABRA experiment as well as the prototype that we are running at MIT called ABRACADABRA-10 cm.

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