

Dark Matter Radio Cubic Meter

Thursday 11 August 2022 14:00 (30 minutes)

The QCD axion, originally proposed as a solution to the strong CP problem in QCD, is one of the most strongly motivated candidates for dark matter. In this talk, I will describe a suite of experiments referred to as the Dark Matter Radio that search for the coupling of axionic dark matter to electromagnetism at masses below $1 \mu\text{eV}$. Axions at these lower mass ranges can naturally be produced in the measured dark matter abundance if Peccei-Quinn symmetry breaking occurs prior to inflation. A particularly well motivated mass range is from 1-100 neV, which corresponds to PQ symmetry breaking near the Grand Unified Theory (GUT) scale. At these lower frequencies, the Compton wavelength is typically larger than the experimental dimension, so the resonators used are similar to lumped-element resonators. This talk will present an overview and status update of the design of the Dark Matter Radio Cubic Meter (DMRadio- m^3) experiment and briefly review plans for a next-generation GUT-scale-sensitive experiment, DMRadio-GUT. Both DMRadio- m^3 and DMRadio-GUT are sensitive to the DFSZ axion model.

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