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Mineral Detection of Dark Matter and Neutrinos

Friday, 12 July 2024 18:00 (30 minutes)

With Dark Matter still eluding detection a window has opened for new ideas in the field. One such idea is to utilize the advent of modern microscopy and computational techniques to read out nm and μm -sized damage features produced by interactions of Dark Matter and neutrinos with nuclei of minerals. Natural minerals should have accumulated these minute features over Myrs, allowing us to use them as “paleo-detectors”. The enormous exposure of such paleo-detectors could provide them with sensitivity that rivals that of modern direct detection experiments. Uniquely, paleo-detectors could be used to probe the distribution of Dark Matter in our Galaxy and the evolution of neutrino fluxes from various sources over our Galaxy’s lifetime. Natural or artificially produced minerals could also be used as directionally sensitive detectors for studying reactor neutrinos and Dark Matter-induced interactions on laboratory timescales. This talk will outline the state of the newly emerging and interdisciplinary research field of mineral-based detectors.

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