

Paleo-Detectors - Digging for Dark Matter and Neutrinos

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Paleo-Detectors are natural minerals which record damage tracks from nuclear recoils over geological timescales. Minerals commonly found on Earth are as old as a billion years, and modern microscopy techniques may allow to reconstruct damage tracks with nanometer scale spatial resolution. Thus, paleo-detectors would constitute a technique to achieve keV recoil energy threshold with exposures comparable to a kiloton-scale conventional “real-time” detector. In this talk, I will discuss the potential of paleo-detectors for the direct detection of dark matter as well as for detecting low-energy neutrinos as are e.g. emitted by core collapse supernovae or our Sun. Furthermore, the age of the minerals provides the ability to look back across Gyr-timescales, giving paleo detectors the unique ability to probe changes in the cosmic ray rate or the galactic supernova rate over such timescales as well as dark matter substructure Earth might have encountered during its past few trips around our Galaxy.

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