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Paleo Detectors for Dark Matter, Neutrinos, and stories about our Galaxy's past

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Poster 79

What if instead of searching for dark matter in a big detector in the lab, one could use billion year rocks as detectors?

- Natural minerals formed on Earth as long as a billion years ago can recode damage tracks from nuclear recoils
- Once created, damage tracks can be preserved for $\gg 10^9$ years
- Modern microscopy technology should allow one to read out small mineral samples with nanometer-scale resolution

Exposure through time

100 g × 1 Gyr = 10 kt × 10 yr

Track length corresponds to energy

$\lesssim$ keV recoil energy thresholds