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DMICA: exploring Dark Matter in natural muscovite MICA

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Searching for dark matter typically requires a large amount of material to capture extremely rare interactions. However, natural mineral crystals like mica have been around for geological time scales, offering plenty of exposure even in small samples. These crystals can hold onto nuclear recoil tracks—evidence of dark matter interactions—for periods longer than the Earth's age. When etched, these tracks appear as observable pits. Building on this, Snowden-Ifft and colleagues in 1995 studied natural Muscovite mica that was 500 million years old, covering an area of just 0.08 square millimeters. We're now planning the DMICA experiment to significantly expand upon this initial research, covering much larger areas. In this presentation, we'll discuss our preliminary experiments aimed at replicating Snowden-Ifft's work as a stepping stone for DMICA. We'll also cover how sensitive the DMICA experiment could be in detecting dark matter, emphasizing that mica's large surface area to volume ratio is particularly useful for detecting very heavy dark matter particles.

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