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## The DarkNESS mission: probing dark matter with a skipper-CCD CubeSat

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The invention of skipper-CCDs with sub-electron noise has paved the way for groundbreaking low-threshold dark matter (DM) experiments, such as DAMIC and SENSEI. Conventionally, these experiments are deployed underground to mitigate cosmogenic backgrounds; however some dark matter signatures are inaccessible to underground experiments due to attenuation in the Earth's atmosphere and crust. The DarkNESS mission will deploy an array of skipper-CCDs on a 6U CubeSat in Low Earth Orbit (LEO) to search for electron recoils from strongly-interacting sub-GeV dark matter as well as X-ray signatures of DM annihilation or decay. Using a series of observations from LEO, the DarkNESS mission will set competitive lower limits on the DM-electron scattering cross section and help inform the experimental conundrum associated with the purported observation of an unidentified 3.5 keV X-ray line, potentially produced from sterile neutrino decay. This contribution will describe the DarkNESS instrument, report the scientific objectives of the DarkNESS mission and the DM parameter space that DarkNESS will probe, as well as outline the technical challenges in using skipper-CCDs in a space-based environment.

### Submitted on behalf of a Collaboration?

Yes

**Author:** Dr SAFFOLD, Nathan (Fermilab)

**Co-author:** ESTRADA, Juan

**Presenter:** Dr SAFFOLD, Nathan (Fermilab)

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