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The Oscura experiment –searching for low-mass dark matter with a very-large array of skipper-CCDs

Monday 18 July 2022 15:00 (20 minutes)

The Oscura experiment will deploy a very-large array of novel silicon skipper Charge Coupled Devices (CCDs) to search for low-mass dark matter (DM). Skipper-CCDs deliver sub-electron readout noise for millions of pixels, providing an ideal detector for low-threshold rare event searches for DM-electron interactions. The Oscura instrument will consist of ~ 10 kg of skipper-CCDs and aims to achieve a total exposure of 30 kg-yr in a low background environment. Oscura will have unprecedented sensitivity to sub-GeV DM particles interacting with electrons, probing DM-electron scattering for DM masses down to ~ 500 keV and DM absorbed by electrons for masses down to ~ 1 eV. This talk will describe the Oscura experiment and the main technical challenges of the ongoing R&D effort, including engaging new foundries in the fabrication of CCDs, developing a cold readout solution, and understanding experimental backgrounds.

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