Fermi National Accelerator Laboratory
LDRD Project Data Sheet - FY18

Project ID: FNAL-LDRD-2018-040
Project title: Dark Matter as Sterile Neutrinos Search Satellite
Principal investigator: Stephanie Timpone

Project description: (short description and explanation of cutting edge, high-risk, high-potential science or engineering)

The goal of this project is to design a scientific experiment consisting of charge coupled detectors (CCDs) that could fit on a low cost, available, small satellite program (CubeSat).

Tie to Mission: (explain the project's relevance or anticipated benefits to Fermilab's and DOE's missions)

The work proposed here has the overarching goal of detecting the 3.55 keV line from radiative decay of dark matter in our own galaxy using a small satellite (CubeSat) instrumented with CCD silicon detectors. This instrument would have a field of view similar to the proposed sounding rocket experiment, with a factor of 4000 larger X-ray collecting area, and a 100 longer exposure time.

Previous year's accomplishments: (as applicable)

N/A

Work proposed for current fiscal year and anticipated / desired results:

Produce a complete design concept for the CubeSat that accounts for all structural, thermal, and electrical/power, and data/communication systems. Define technical concepts to be demonstrated: Thermal calculations/analysis of CubeSat design, power consumption needs and distribution details, mechanical structural engineering calculations, layout and integration of components within CubeSat mass/size constraints.

Project funding profile: (costs, budgets, projected budgets, and total)

Prior year(s) costs	FY18 ½	FY19	FY20	FY21 ½	Total
N/A	60,000	253,800	231,500	89,400	634,700

Project Start Data: 3/15/2018 Total Approved Project funds: $ 634,700