Fermi National Accelerator Laboratory
LDRD Project Data Sheet - FY18

Project ID: FNAL-LDRD-2018-020
Project title: Increasing the intensity of muon based experiments using wedge absorbers
Principal investigator: Diktys Stratakis

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

A novel approach is being proposed for momentum selection and reduction of the momentum spread for the muon beams generated on the Muon Campus. The concept relies on placing a polyethylene wedge absorber at a point along the beam transport system with non-zero dispersion. The technique has direct relevance to muon-based experiments such as the Fermilab Muon g-2 and Mu2e experiments. Recent numerical simulations predict that this technique has the potential to enhance the number of stored muons for the Muon g-2 Experiment by 20-30%.

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

If successful, the improved statistics from delivery of more muons into the storage ring could push the capabilities of the experiment into new regions of parameter space, allowing the measurement of the anomalous magnetic moment with unprecedented precision.

Previous year's accomplishments: (as applicable)

N/A

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

Tune the beamline nearby optics so that the best focusing at the location of the wedge. Finalize the desired length, angle, and offset of the wedge that will provide peak performance. Produce the required engineering drawings for construction. The following year should allow the system to be fabricated, installed, and tested.

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

Prior year(s) costs	FY18 ½	FY19	FY20	FY21 ½	Total
N/A	150,000	164,155			314,155

Project Start Data: 3/15/2018 Total Approved Project funds: $ 314,155