Fermi National Accelerator Laboratory
LDRD Project Data Sheet - FY14

Project ID: FNAL-LDRD-2014-025
Project title: The Sinuous Target
Principal investigator: Robert Zwaska

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

The project is to generate a new, engineered material for use in high-power accelerator targets. The material will be composed of a multitude of interlaced wires of small dimensions. The material will have improved resistance to thermal shock and the interlaced nature of the wires will have mechanical benefits. The material will allow for targets to take higher incident power with more efficient secondary beam production.

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

A high-power target is an integral part of a neutrino beam, muon beam, other intensity frontier beams for high energy physics as well as neutron and rare isotope beams outside of high energy physics. Thermal, mechanical, and radiation effects limit the degree to which targets can be subject to high incident beam power. If successful, the material developed has applications at accelerators at Fermilab and within the DOE complex. There will be some focus on these materials in particular for neutrino targets.

Previous year's accomplishments: (as applicable)

A postdoctoral researcher has been brought on board and the project started in earnest in Jan 2016. The focus has been on modeling and developing manufacturing technique for sinuous material including electrospinning. A secondary effort has been the investigation of an array of analogue materials. Some testing using the tensile tester has been made.

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

The project has been recommended to be re-focused upon a prompt identification of the most promising materials rather than continued development of a manufacturing process. It may be that a universal material test machine will be required for a more comprehensive suite of tests.

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

Prior year(s) costs	FY14	FY15	FY16	FY17 budgeted	Total
	7,014	26,314	112,227	250,000	395,555

Project Start Data: 7/15/2014   Total Approved Project funds: $ 550,008