

## Fermi National Accelerator Laboratory LDRD Project Data Sheet - FY18

**Project ID:** FNAL-LDRD-2018-009

**Project title:** High Temperature Superconducting Magnet with Circular Coils

**Principal investigator:** Vladimir Kashikhin

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

The main goal of proposed research and development is to design, build, and test a high temperature superconducting (HTS) magnet which has a novel design most suitable for HTS configuration. Two circular HTS coils will be assembled within an iron yoke forming a quadrupole field. After initial testing, the HTS magnet will have a HTS superconducting switch where the magnet could work in a persistent current mode, disconnected from a power source.

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

Such a novel magnet, if successful, could lead to designs that replace non-HTS magnets offering energy and cost savings. Future linear accelerators require many room temperature or superconducting multipole magnets. If successful, novel magnets based upon this technology could yield large cost savings over conventional approaches.

**Previous year's accomplishments:** (as applicable)

N/A

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

An initial design for the quadrupole magnet will begin before the selection and procurement of HTS superconductor for the coils. These items will precede the fabrication of the parts and final magnet assembly.

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

Prior year(s) costs	FY18 ½	FY19	FY20	FY21 ½	Total
N/A	150,000	250,000	95,305		495,305

Project Start Date: 3/15/2018

Total Approved Project funds: \$ 495,305