

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

Project ID: FNAL-LDRD-2018-049

Project title: A Quasi-Continuous Wave (CW) bunch-by-bunch H- Neutralization Laser System for Longitudinal Phase Collimation in Linacs and other Applications

Principal investigator: Dave Johnson

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

Two major aspects for this R&D program are 1) the reduction in required laser energy for bunch photoneutralization, and 2) the development of high peak and average power burst-mode pulsed laser system. With the completion of these two goals we will demonstrate the ability to reduce the longitudinal emittance presented to the downstream accelerating structures.

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

The development of quasi-continuous wave, quasi-CW, laser systems utilized for bunch by-bunch manipulation of H- beams in beam loss control and other applications such stripping, chopping, notching, collimation, etc., is essential not only for present high intensity accelerators, but for the next generation accelerators to realize multi-MW beam power for Neutrino Facilities.

Previous year's accomplishments: (as applicable)

N/A

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

For the first phase of the project, the goal is to minimize the required laser pulse energy for H- neutralization. Design of the optical cavity and laser parameters is required before the construction of the cavities. Some design work will proceed towards the development of a high peak and average power burst-mode laser system

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

Prior year(s) costs	FY18 ½	FY19	FY20	FY21 ½	Total
N/A	150,000	485,891			635,891

Project Start Data: 3/15/2018

Total Approved Project funds: \$ 635,891