**Project X Physics Program and High-Power Beam Issues**

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“Project-X” is a US led accelerator initiative with strong international participation that aims to realize a next generation proton source that will dramatically extend the reach of Intensity Frontier research. The state of the art in Super-Conducting RF has advanced to a point where it can be considered and implemented as the core enabling technology for a next generation multi-megawatt proton source--reliably delivering unprecedented beam power at duty factors ranging from 10-5 to 100%. The base Super-Conducting RF technology also supports flexible beam-timing configurations among simultaneous experiments, allowing a broad range of experiments to develop and operate in parallel. The DOE Office of High Energy Physics and its advisory bodies have recognized this potential and are supporting R&D for Project-X that could lead to a construction start as early as 2016.

Project-X will provide multi-megawatt proton beams from the Fermilab Main Injector over the energy range 60-120 GeV simultaneous with multi-megawatt protons beams 1-3 GeV (kinetic) with very flexible beam-timing characteristics as well as substantial beam power at 8 GeV. The Project-X research program includes world leading sensitivity in long-baseline and short-baseline neutrino experiments, a rich program of ultra-rare muon and kaon decays and opportunities for next-generation electric dipole moment experiments and other nuclear/particle physics probes that reach far beyond the Standard Model. These research opportunities depend critically on state-of-the-art and next generation targetry and beamline systems which will be discussed.