Studies of fundamental physics with leptons and quarks

While so far the standard model (SM) successfully describes all available experimental data, particle theorists agree that it is not complete.
The primary objective of the research that will be performed at FNAL is to understand the structure of the fundamental Lagrangian obtained from experimental data collected by the Intensity Frontier experiments. In particular we shall study effects of nonstandard and SM neutrino
interactions with nucleons and nuclei on extraction of neutrino oscillation parameters, provide constraints on specific models of new physics, especially on interaction couplings of new particles with heavy quarks from studies of gluonic operators in $\mu \rightarrow e$ conversion experiments,
and study possible manifestations of new physics effects in the transitions of charm hadrons.