

 ST. OLAF PHYSICS DEPARTMENT

COLLOQUIUM SERIES

Dethroning the Standard Model: Neutrinos and Muons at Fermilab

Ben Messerly
University of Minnesota

WEDNESDAY, MAY 3
3-4 PM | RNS210

ZOOM LINK ON PHYSICS WEBSITE

The Standard Model of Particle Physics, which describes 17 fundamental particles and the interactions between them, has reigned in its nearly original form since its completion in the 1970's. And while we know the Standard Model does not describe phenomena like dark matter and gravity, frustratingly little evidence has surfaced that contradicts the predictions it does make, offering few inroads to theoretical development. Two fundamental particles, the neutrino and muon, both offer exciting experimental promise, each in their own perpendicular ways, at dethroning the Standard Model, and Fermilab is the global center for the regicidal research efforts. For more than a decade, Fermilab has been pushing the intensity frontier – advancing the technology of particle beams and particle storage in order to search for Beyond the Standard Model physics via very rare processes. In this talk, I present this theory-experiment Standard Model dilemma and the Fermilab-based MINERvA neutrino and Mu2e muon experiments attempting to address it. My work spans from lab detector R&D and construction, to data science and physics simulations, to scientific and high performance computing techniques, and to many topics in between.

