

Exotic Physics with the NOvA Detectors

I serve as co-head of the NOvA Exotics Group, which is investigating physics opportunities with the NOvA near and far detectors outside of the long-baseline neutrino physics for which the detectors were designed.

Many of these topics require asynchronous data-driven triggers, rather than the usual synchronous beam-gate triggers coincident with the neutrino beam. One compelling example is the magnetic monopole trigger, which we wish to implement this spring. My research group personnel stationed at Fermilab are leading both the data-driven trigger effort and the magnetic monopole search.

The Mu2e Cosmic Ray Veto

I serve as head of the Cosmic Ray Veto detector group for the Mu2e experiment, which is designed to investigate extremely rare muon processes as a window into new physics at extremely high mass scales.

The Cosmic Ray Veto is one of the three detector subsystems. Its task is to identify and veto cosmic-ray muons, which otherwise would produce about one background event per day. Mu2e is seeking approval this spring from the Department of Energy to start construction. The immediate focus of my work at Fermilab will be to complete the design, simulation, and R&D work needed for this approval, including the writing of the technical design report. After this is completed we will begin the fabrication of the Cosmic Ray Veto.