

Probing Astro- and Particle Physics with Supernova and Solar Neutrinos at SURF

Wednesday, May 11, 2022 11:40 AM (30 minutes)

We discuss opportunities of experiments at SURF to resolve questions in both astrophysics and particle physics by measuring astroparticle neutrinos. Massive stars produce a core-collapse supernova at the end of their life cycle. In this supernova, the majority of the binding energy of the progenitor star is released as an intense pulse of neutrinos, first observed in SN 1987a. As neutrinos are weakly interacting and promptly escape the dying star, this burst of neutrinos carries detailed information about the core-collapse process that occurs within the stellar core. We will cover the potential to observe these neutrinos and study the core-collapse mechanism with DUNE and dark matter experiments. Further, we will discuss opportunities to improve understanding of the solar neutrino flux at SURF. DUNE will be a powerful machine for precision measurements of the solar oscillation parameters and search for new physics signatures in the solar energy spectrum which we will cover.

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