

Real-time detection of Supernova Neutrinos in XENONnT

Friday, 14 June 2019 18:00 (3 hours)

The XENONnT experiment, which is projected to begin operation by early 2020 at the Laboratori Nazionali del Gran Sasso (LNGS), is a double-phase Time Projection Chamber with a 6 tonne liquid xenon target. Although primarily developed to detect Weakly Interactive Massive Particles (WIMPs) that scatter off xenon nuclei, the detector will also be sensitive to neutrinos coming from a supernova burst beyond the edge of the Milky Way, going past the Large Magellanic Clouds (with a significance of 3 sigma). Given its low background rate and neutrino flavour blindness properties of coherent elastic neutrino scatterings (CEvNS), XENONnT will be able to detect supernova (SN) neutrino bursts in real-time. We describe the development of a framework to run an active SN trigger using XENONnT's open-source processor (Strax), based on the continual counting of proportional scintillation signals (S2) induced by such SN neutrinos. With its tonne-scale target and low background rate, we show that XENONnT will be capable of actively contributing to the SuperNova Early Warning System (SNEWS).

Primary authors: Mr PERES, Ricardo (University of Zurich); XENON COLLABORATION

Presenter: Mr PERES, Ricardo (University of Zurich)

Session Classification: Poster session and welcome dinner reception