

Staying Cool, The Thermoelectric Cooling of SiPMs

Monday, August 19, 2024 2:45 PM (10 minutes)

The proposed future experiment nEXO aims to find neutrino-less double beta decay in liquid xenon. A critical component of nEXO is the silicon photomultipliers (SiPMs) used to detect the light emitted by the decay. To understand how the SiPMs will behave in nEXO, a characterization of them at liquid xenon temperature, -100 C, is necessary. Fortunately, characterization at -40 C is predictive of their behavior at -100 C. We are building a system using cascading thermoelectric coolers with an open loop water cooling setup to scan a SiPM with a single photon light source. Preliminary results show that it is possible to cool one SiPM from room temperature to less than -10 C. To reach the -40 C threshold, future work will include a redesign of the geometry of the cooling units and an upgrade of the cooling module.

What area of study best describes your talk?

Physics

If you answered 'Other', please provide the study area.

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Session Classification: Presentations