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The Calibration Source Deployment and Light Injection Monitoring Systems for the SuperNEMO Experiment

SuperNEMO is a next generation tracking-calorimeter style detector and successor to NEMO-3 which will continue to search for neutrinoless double beta decay.

To exploit the full power of the detector and its technique, the SuperNEMO calorimeter, consisting of photomultiplier tubes coupled to scintillator blocks for a total of 712 optical modules, needs to be continuously monitored and calibrated to within 1%. The long exposure times typical of double beta decay searches also necessitate long term measurement of the stability of the calorimeter.

A robust system has been developed to achieve these goals with minimal impact to data collection. It consists of two parts: the calibration source deployment and light injection monitoring systems. The deployment system introduces a 207-Bi source of conversion electrons that illuminate the calorimeter to make absolute energy calibrations up to 1 MeV. The light injection system will then monitor the stability and linearity of each optical module up to higher energies via the injection of pulsed LED light. An external reference optical module will monitor the LED light levels against an 241-Am calibration source to aid in the long term tracking. This poster will describe the details of this system.

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