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Commissioning and calibration of the Super-FGD in the T2K experiment near detector upgrade

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The Super Fine-Grained Detector (SFGD) is part of a significant upgrade to the near detector in the Tokai to Kamioka (T2K) long-baseline neutrino experiment. It serves to provide excellent precision in measurements of neutrino cross-sections, mass ordering and Charge-Parity asymmetry. With almost 2 million plastic scintillator cubes threaded with wavelength shifting fibres to make up about 56,000 channels, the commissioning and calibration of this detector presents numerous challenges.
This poster describes the calibration process and preparations for neutrino data taking with the SFGD, including the incorporation of the task management software Luigi, developed by the music streaming service Spotify. By automating the process, data taken with LED pulses between neutrino beam spills is used to monitor the stability of the high gain and other properties of the channel readout. The procedures for calculating the gain and pedestal, and classification of channel output are described, where results using LED data taken in February 2024 indicate good calibration for nearly all channels even at this early stage. With the full detector installation in April 2024, commissioning efforts will be finalised, reconstruction of particle tracks and identification can be re-calibrated, and physics analyses will commence.

Poster prize

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