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Calibrating MINOS+: Current Methods, Recent Updates, and Planned Upgrades

The MINOS+ experiment utilizes the existing MINOS detectors, which are exposed to the higher energy, higher intensity upgraded NuMI muon neutrino beam. With this setup, MINOS+ hopes to conduct both precision measurements of neutrino oscillation, as well as searches for new physics. To carry out these studies, it is necessary to understand the energy scales of the detectors as precisely as possible. I present the current scheme by which the MINOS detectors are calibrated, primarily via cosmic ray muons and an in-situ light injection system. The poster discusses recent improvements to the calibration, such as the removal of an angular dependence in the energy scale calculated from cosmic muons. Finally, it will also present proposed future improvements to the calibration, which can further reduce the level of systematic error in the MINOS+ energy scale.

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Track Classification: Long Baseline Oscillations