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Time and Position Calibration of IceCube Optical Modules
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The IceCube high-energy neutrino telescope uses optical modules (OMs- each containing a photomultiplier tube) embedded in glacial ice to detect Cherenkov photons in order to reconstruct the path of neutrino-induced muons. To accurately reconstruct muon tracks, and thusly perform neutrino astronomy, the detector must be well calibrated to minimize uncertainties in the optical module (OM) positions and the arrival times of photons at each OM. In the process of constructing a kilometer-scale detector near the South Pole, the IceCube Collaboration recently deployed a string of sixty OMs deep in the Antarctic Ice and sixteen OMs at the surface above the string. Using down-going cosmic ray muons, it is possible to verify the IceCube time and position calibrations determined by other in situ methods. This work will describe a calibration technique used by IceCube and present results of recent experimental data from cosmic ray muons.

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