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## **New calibration methods for IceCube, DeepCore and PINGU**

To achieve precision measurements with the current IceCube/DeepCore setup and future extensions, systematic uncertainties would need to be reduced. The current primary systematic uncertainties arise from the ice properties and the optical acceptance of the digital optical modules. Improved calibration is not only mandatory for the planned low energy extension, called PINGU, but the current detector array will gain, providing a path to e.g. precision measurements of neutrino oscillation parameters.

We will discuss the development of two potential calibration improvements: (i) an in-situ self-calibrated light source, the "POCAM" module, and (ii) utilizing Michel electrons from decaying stopped muons as source of Cherenkov light with a known energy profile.

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