Overview of the EEEMCal Calibration Methods

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- **The primary calibration** will be done using a light monitoring system. The light (optical photons) will be delivered to each calorimeter tower using optical fibers from the light source (TBD, Laser or LEDs) to the (TBD, back or front) face of the crystal. The light intensity (amount of photons) should be the same as much as possible for all channels. It is not trivial task and will strongly depend on the design of the light monitoring system, individual fibers (examples: NPS, CCAL, HyCAL) versus Plexiglas plate covering entire front face of the calorimeter (example: GlueX FCAL). For the same light intensity a series of calibration runs with different BIAS voltages will be taken. The SiPM response amplitude or integral(charge) will be plotted as a function of BIAS voltage, and after fitting the function and extracting parameters, the function can be used to match the SiPMs gain for the entire calorimeter.

- **The secondary calibration** will be done using cosmic muons and will allow to take into account the variations between crystals, wrapping, and optical coupling. To choose a straight track one can use the coincidence between DIRC+nECAL towers (exact algorithm TBD). Plotting the calorimeter tower amplitude, charge distribution one should observe a peak corresponding to ~15MeV in PWO for straight tracks crossing a crystal perpendicularly. The calibration coefficients are obtained using the results of a Gaussian fit.

- **The final calibration** will use neutral pions and an iterative procedure based on detection of these neutral pions. Neutral pions are copiously produced in inelastic events and a wide energy spectrum is covered by photons from pi0 decays. The signal is clear and the procedure does not require external information (from trackers) and can run online and offline mode. The method will provide fine tuning of the ECAL.