

## Study on the Dynamic Range of SiPMs with Large Pixel Number

*Tuesday, 25 October 2022 11:15 (15 minutes)*

The future Circular Electron-Positron Collider (CEPC) is a large-scale experimental facility, which aims to accurately measure the Higgs boson, electroweak physics and flavor physics. For the detector system in CEPC, a highly granular crystal electromagnetic calorimeter is proposed to achieve an EM energy resolution of less than 3%. It is a homogenous structure with long crystal scintillator bar as active material. The energy deposition range in one crystal bar is about  $500\text{keV}\sim 10\text{GeV}$ . SiPM, as the preferred photon detector in crystal bar ECAL, should cover a dynamic range of at least 50000 photons. The response calibration for SiPMs with such a large dynamic range is challenging. We have developed an experiment which used laser and PMT as light source and scaler respectively. By adjusting the bias voltage, we expanded the linear region of the PMT to cover the whole response range of SiPMs. The final response curves are reasonable. We have also built a simulation model to describe them. Improvements to this experiment are still ongoing, including design of large dynamic range PMT, optimization of SiPM electronics and light source.

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**Session Classification:** Calorimeter