

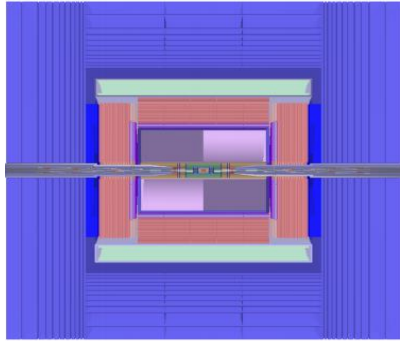


The HEP application of NDL EQR-SiPM

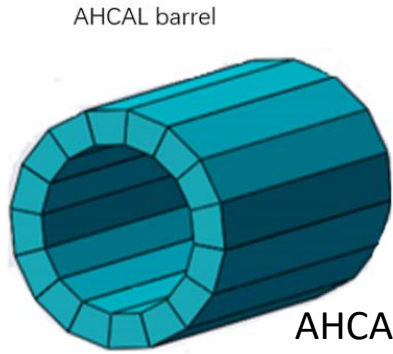
Boxiang Yu* On behalf of CEPC Calorimeter Working Group

SiPM workshop,
Oct. 2-4, 2019, Bari, Italy

Email: yubx@ihep.ac.cn

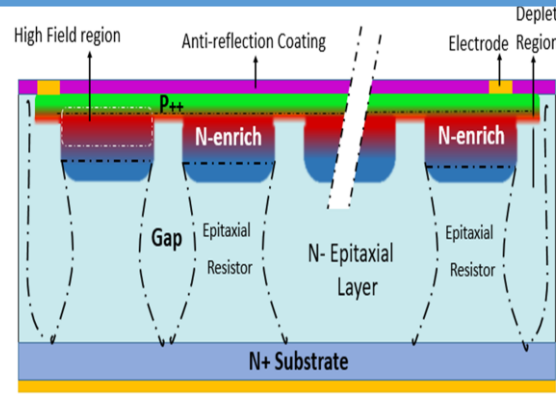


CEPC detector



AHCAL barrel

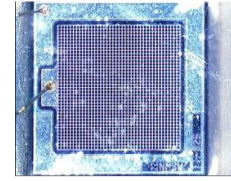
AHCAL



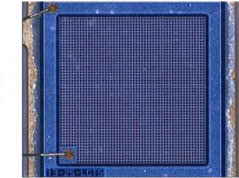
NDL-SiPM structure

Candidate SiPMs for CEPC-AHCAL

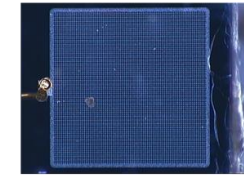
12571-025P
overvoltage4V



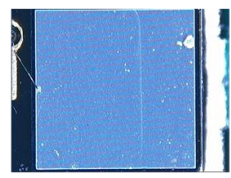
13360-1325PE
overvoltage4V



NDL-125
overvoltage4V



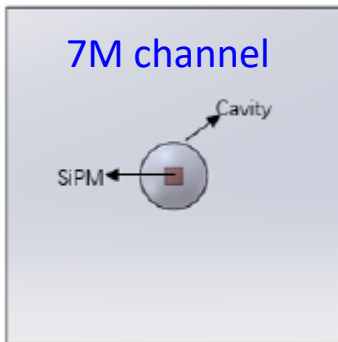
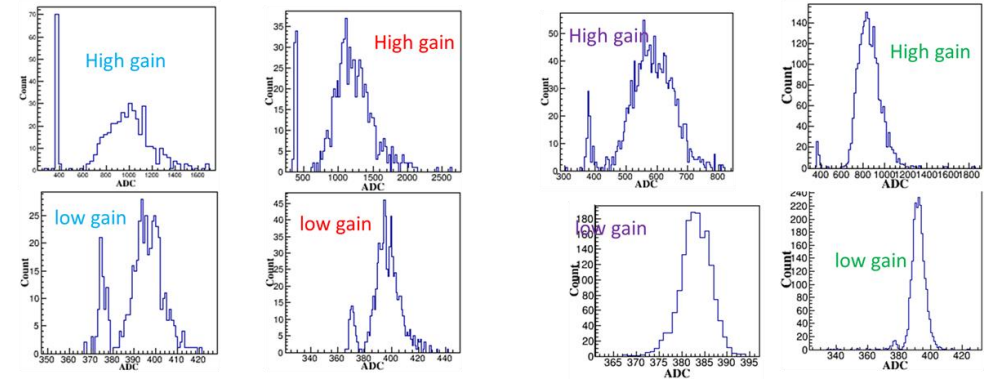
NDL-3030



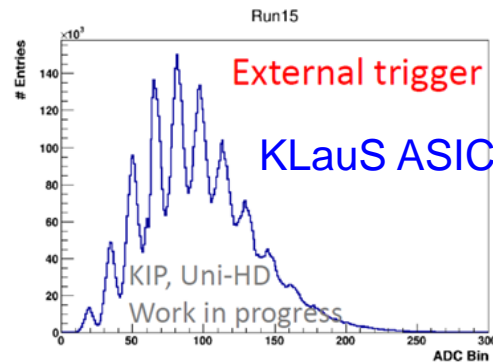
The Circular Electron Positron Collider (CEPC) as a Higgs factory was proposed by China in 2013. The CEPC detector design was using International Linear Collider Detector as an initial baseline. AHCAL is an option for HCAL based on plastic scintillator.

Novel Device Laboratory (NDL) has developed silicon photomultiplier (SiPM) technologies with **epitaxial quenching resistors** (EQR). NDL EQR-SiPM is easy to implement owing to its unique structure featuring intrinsic continuous and uniform cap resistor layer. **Thus it has higher fill factor and PDE.**

Sr90 response with SPIROC2E



7M channel



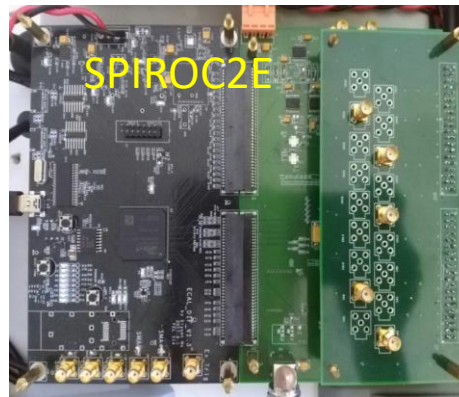
Run15

External trigger

KLauS ASIC

KIP, Uni-HD

Work in progress



SPIROC2E

Conclusion

NDL-SiPM has higher PDE. NDL-SiPM can be calibrated by SPIROC2E ASIC. The MIPs response could be finely separated with noise by SPIROC2E ASIC. NDL-SiPMs can satisfy the requirement of CEPC-AHCAL.