H2GCROC: ASIC for SiPM readout of the CMS High Granularity Calorimeter.

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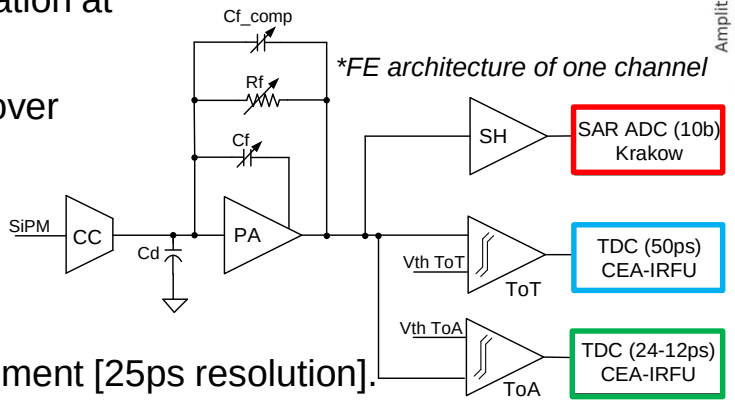
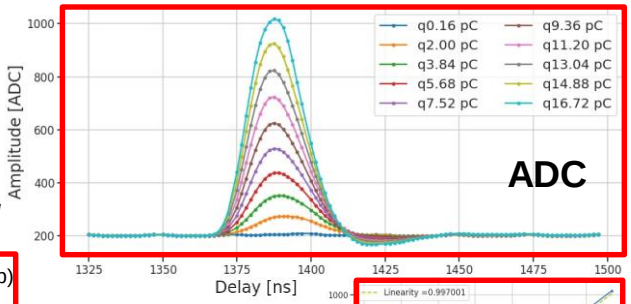
- Radiation-hardened TSMC 130nm CMOS chip.
- 72 reading out standard channels, 2 channels for MIP calibration, and 4 channels not connected for common-mode noise estimation.
- Current conveyor (**CC**) attenuation at the input from 0.025 to 0.325.
- Charge information with time over threshold (**ToT**) [200 ns and 50 ps resolution].
- Charge measurement range from 160 fC to 320 pC.
- Time of arrival (**ToA**) measurement [25ps resolution].
- Leakage current compensation up to 1.2 mA.

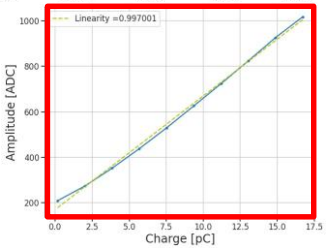


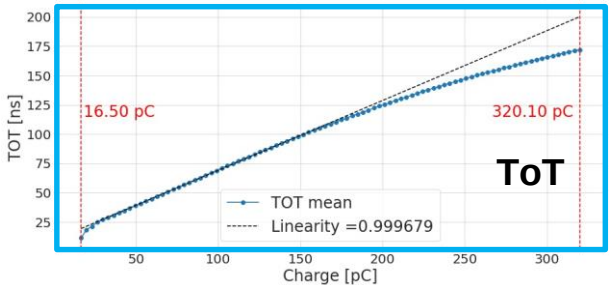
*FE architecture of one channel

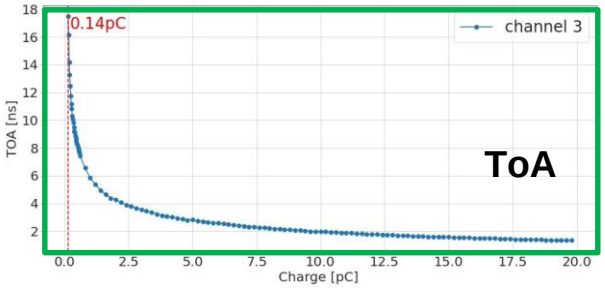


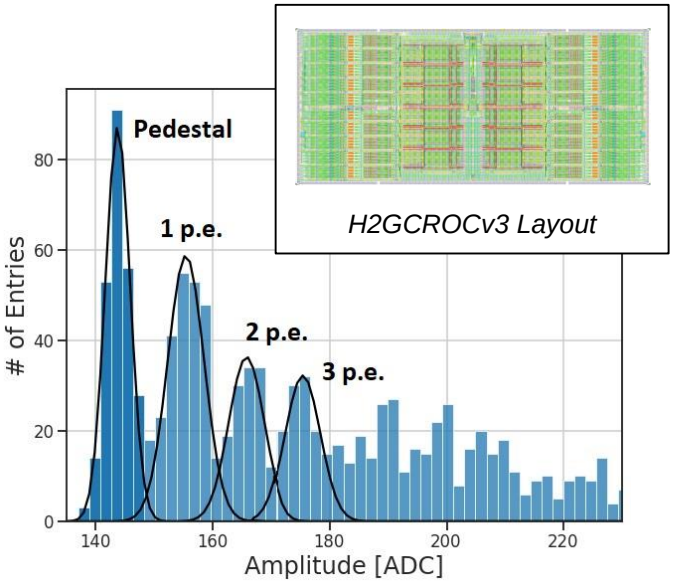
- **ADC**

Linearity of 99.7%









H2GCROCv3 Layout

- Calibration circuit for internal or external injection.
- Compensation for sensor gain between channels.

Single-photon pixels measured with default configuration and phase 13 selected.

*All measurements performed with H2GCROCv3 ASIC.