

# Characterisation studies of two front-end electronics chips designed for SiPM readout

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A new front-end ASIC named “PIST” (pico-second timing) has been successfully developed using 55 nm CMOS technology for the silicon photomultiplier (SiPM) readout with a single channel with a major aim of fast timing. We performed extensive tests to evaluate the timing performance of a dedicated test stand equipped with a PIST chip. The results show that the system timing resolution can sub 10 ps for large SiPM signals, while the PIST intrinsic timing resolution is better than 5 ps. The PIST dynamic range has been further extended using the time-over-threshold (ToT) technique.

Meanwhile, we fully characterised a newly developed commercial SiPM-readout 32-channel ASIC for developments of future high-granularity crystal calorimetry, including the single photon calibration and the dynamic range of different gain regions. Other promising potentials include fast timing resolution, fast readout speed and low power dissipation. Comprehensive measurements were made with a laser beam and high-energy particle beams with crystals and SiPMs. First testing results show that this chip has an excellent signal-to-noise and a large dynamic range.

This presentation will introduce the ASICs as well as dedicated test stands and also present highlighted results including the timing resolution, single photon calibration and dynamic range.

## Collaboration

## Role of Submitter

I am the presenter

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