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# Pisameet 2018

# Abstracts

### Technologies for Future Vertex and Tracking Detectors at CLIC

- Speaker: Simon Spannagel (CERN)
- Status: Accepted for oral presentation
- Sessions: New ideas on detection techniques, Detectors for fundamental physics and gravitational waves, Front-end electronics and trigger systems
- Abstract: CLIC is a proposed linear e+e- collider with center-of-mass energies of up to 3TeV. Its main objectives are precise top quark, Higgs boson and Beyond Standard Model physics. In addition to spatial resolutions of a few micrometers and a very low material budget, the vertex and tracking detectors also require timing capabilities with a precision of a few nanoseconds to allow suppression of beam-induced background particles. Different technologies using hybrid silicon detectors are explored for the vertex detectors, such as dedicated readout ASICs, small-pitch sensors with active edge as well as capacitively coupled HV-CMOS sensors. Monolithic sensors are the current choice for the tracking detector, and a prototype using a HR-CMOS process is being designed. Different designs using a silicon-on-insulator process are under investigation for both vertex and tracking detector. All prototypes are tested in laboratory and beam tests, and newly developed simulation tools combining Geant4 and TCAD are used to assess and optimize their performance. This contribution gives an overview of the R&D program for the CLIC vertex and tracking detectors, highlighting new results from the prototypes.
- Slides

### Power-pulsing studies with Timepix3 hybrid readout assemblies

- Speaker: Estel Perez Codina (CERN)
- Status: Withdrawn (accepted as poster)
- Sessions: New ideas on detection techniques, Detectors for fundamental physics and gravitational waves, Front-end electronics and trigger systems
- Abstract: The physics aims at the proposed CLIC e+e- linear collider require building an ultra-low mass (~0.2% X0 per layer) vertex detector that can provide a point resolution of a few μm as well as a few ns time stamping capabilities. To minimize the material budget, an air-flow cooling system is foreseen for the vertex detector. This requires very low power dissipation, which is achieved by exploiting the low duty cycle of the CLIC machine (156-ns-long periods of collisions repeating at 50 Hz), allowing for pulsed power operation. Different technologies using hybrid silicon pixel detectors are explored for the vertex detectors, where a high particle flux is expected. Timepix3 is a hybrid readout chip that includes power pulsing features, such as dynamic switching between nominal power and shutdown modes, and, in the digital domain, gating the clock of the pixel matrix. This contribution reports the performance of the Timepix3 chip operating in pulsed power mode, in terms of power saving and detection efficiency, for various pulse configurations. Measurements were performed in a pion beam test with a reference telescope, as well as in the laboratory using radioactive sources.

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