

Abstract Submitted
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Implementing an External Charge Injection System into the ILC-SiD KPiX ASIC for Charged-Particle Tracking Characterize¹ SHEENA SCHIER, BRUCE SCHUMM, Santa Cruz Institute for Particle Physics — KPiX 9 is a 512 channel ASIC designed by SLAC that is competing to perform detector readout for the International Linear Collider (ILC) and is currently the only readout chip that aims to fulfill both tracking and calorimetry needs for the ILC. To achieve the efficiency standard set for charged-particle tracking in the ILC a 1fC threshold; therefore, we need to understand the gain to 1fC as well. We connected an ECIS to 4 of the 6 bonded out channels in order to inject charges down to 1fC without distortion from internal calibration offsets. During the ILC beam spill, KPiX acquires up to 4 signals; our current analysis is restricted to the first acquisition only. Only 3 of the 4 ECIS channels were observable and displayed charge sensitivity down to around 2.5fC. The expected gain is -75mV/fC and the expected zero offset is at 2500mV; the gains and offsets are inverted by the amplifier. The average gain for the sensitive region is -72.8mV/fC with RMS 1.15mV/fC, with average voltage offset 2587mV with RMS 37.9mV. The gain curves are consistent and flatten out together along the charge axis. The average minimum threshold is 2.5fC with RMS 0.11fC. We conclude that the first acquisition of the KPiX ASIC is not efficient for ILC tracking and are now working to understand the other three acquisitions.

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