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Design and Implementation of TCSA-based Readout System for STCF ECAL

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In this talk, a system based on Time and Charge Sensitive Amplifier (TCSA) reading out the signal of pure CsI crystal adopted in Super Tau-Charm Facility (STCF) Electromagnetic Calorimeter (ECAL) is reported. To realize high-resolution gamma detection and electron-hadron discrimination, the readout system needs to meet the demands of low noise and high-precision time resolution. By noise analysis and on-board testing, parameters of the electronic system are optimized. Thus a noise level of about 3200 electrons with four S8664-1010 avalanche photodiodes (APDs) is realized. Meanwhile, the fast rising edge of the unshaped signal enables the leading edge timing accuracy to reach 150 picoseconds. Furthermore, online Field-Programmable Gate Array (FPGA) waveform fits, which can provide time and amplitude results simultaneously, can achieve a timing performance similar to leading edge timing. The noise and timing performances indicate the readout system meets the design requirements.

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No, this is an entirely new submission.

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