

The W-Si High Precision Preshower Detector of the FASER Experiment at the LHC

Saturday 20 July 2024 09:00 (18 minutes)

The FASER experiment at the Large Hadron Collider (LHC) aims to detect new, long-lived fundamental particles and to study neutrino interactions. To enhance its discovery potential, a new W-Si preshower detector is being built, which will enable the identification and reconstruction of electromagnetic showers produced by high-energy photon pairs with separations as fine as 200 μm . The detector incorporates a cutting-edge monolithic ASIC with hexagonal pixels measuring 100 μm in pitch, designed to achieve an extended dynamic range for charge measurement and capable of storing charge information for thousands of pixels per event. The ASIC integrates fast front-end electronics based on SiGe heterojunction bipolar transistor technology, providing a O(100) ps time resolution. Analog memories embedded within the pixel array facilitate frame-based event readout, minimizing dead areas. In this presentation, we detail the design and expected performance of the preshower detector.

Alternate track

1. Detectors for Future Facilities, R&D, Novel Techniques

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