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The monolithic ASIC for the high precision preshower detector of the FASER experiment at the LHC

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The FASER experiment at the LHC will be instrumented with a high precision W-Si preshower to identify and reconstruct electromagnetic showers produced by two O(TeV) photons at distances down to 200µm. The new detector features a monolithic silicon ASIC with hexagonal pixels of 100 µm pitch, extended dynamic range for the charge measurement and capability to store the charge information for thousands of pixels per event. The ASIC integrates SiGe HBT-based fast front-end electronics with O(100) ps time resolution. Analog memories inside the pixel area are employed to allow for a frame-based event readout with minimum dead area. A description of the pre-shower and its expected performance will be presented together with the lab and testbeam results of the pre-production ASIC. While the final production chip submission was just launched, some information on its design will be given.

Your name

Didier Ferrere

Institute

Université de Genève

Email address

didier.ferrere@cern.ch

Author: FERRERE, Didier (Universite de Geneve (CH))

Presenter: FERRERE, Didier (Universite de Geneve (CH))

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