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A silicon pre-shower detector to enable di-photon measurement in the FASER experiment at CERN.

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The FASER experiment at CERN takes advantage of the enormous flux of hadrons produced at zero-angle at the ATLAS interaction point to perform the first search for low-mass, Long Lived Particles (LLPs) at the LHC. The present design of the experiment is optimised to measure LLPs decaying into two charged leptons. To extend the discovery potential of the experiment to neutral particles in the final state, a tungsten-silicon pre-shower detector is under construction to enable the discrimination of two photons with O(TeV) energies and separation down to 200 μm .

The new pre-shower will be made of interleaved layers of tungsten absorbers and monolithic silicon pixel sensors in SiGe BiCMOS. The detector ASIC will have hexagonal pixels of 65 μm side, an extended dynamic range for the charge measurement and capability to store the charge information for hundreds of pixels per event with very limited dead area.

A summary of the project, including simulation results and a description of the monolithic ASIC will be presented.

Authors: SFYRLA, Anna (Universite de Geneve (CH)); PAOLOZZI, Lorenzo (CERN); PICARDI, Antonio (Universite de Geneve (CH)); PANDINI, Carlo Enrico (University of Geneva); MAGLIOCCA, Chiara (Universite de Geneve (CH)); RIZZI, Chiara (University of Geneva); SULTAN, D M S (Universita degli Studi di Trento and INFN (IT)); FERRERE, Didier (Universite de Geneve (CH)); MARTINELLI, Fulvio (EPFL - Ecole Polytechnique Federale Lausanne (CH)); IACOBUCCI, Giuseppe (Universite de Geneve (CH)); PERIC, Ivan (KIT - Karlsruhe Institute of Technology (DE)); MUNKER, Magdalena (CERN); NESSI, Marzio (CERN); VICENTE BARRETO PINTO, Mateus (Universite de Geneve (CH)); MILANESIO, Matteo (Universite de Geneve (CH)); TARANNUM, Noshin (Universite de Geneve (CH)); VALERIO, Pierpaolo (CERN); KOTITSA, Rafaella Eleni (Universite de Geneve (CH)); CARDARELLI, Roberto (INFN e Universita Roma Tor Vergata (IT)); CARDELLA, Roberto (Universite de Geneve (CH)); GONZALEZ SEVILLA, Sergio (Universite de Geneve (CH)); DEBIEUX, Stephane (Universite de Geneve (CH)); MORETTI, Theo (Universite de Geneve (CH)); GURIMSKAYA, Yana (Universite de Geneve (CH)); FAVRE, Yannick (Universite de Geneve (CH))

Presenter: PAOLOZZI, Lorenzo (CERN)

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