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MONOLITH –picosecond time stamping in fully monolithic highly-granular pixel sensors

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The MONOLITH H2020 ERC Advanced project aims at the development of fully monolithic highly granular pixel sensors with picosecond time stamping capabilities. To reach a picosecond precise sensor response, a thin gain layer has been implemented deep inside a high-resistivity epitaxial layer. By moving the gain layer away from the pixel implantation, the pixel size can be reduced down to 50 μ m, allowing to simultaneously reach a high spatial precision. Making use of a SiGe BiCMOS 130 nm process technology, a fast and low noise frontend has been realized. First prototypes with different doping levels and different complexity of in-pixel circuitry have been produced in this technology to investigate and optimize their performance in terms of e.g. sensor gain and time-stamping capability. Laboratory and test-beam measurements have been made, with a focus on sensor gain, detection efficiency, and time resolution. This talk will introduce the MONOLITH project and summarise the main measurement results.

Author: Mr MILANESIO, Matteo (Universite de Geneve (CH))

Co-authors: IACOBUCCI, Giuseppe (Universite de Geneve (CH)); PAOLOZZI, Lorenzo (CERN); VALERIO, Pierpaolo (CERN); Dr MUNKER, Magdalena (Université de Genève); GURIMSKAYA, Yana (Universite de Geneve (CH)); VICENTE BARRETO PINTO, Mateus (Universite de Geneve (CH)); CARDELLA, Roberto (Universite de Geneve (CH)); MORETTI, Theo (Universite de Geneve (CH)); SAIDI, Jihad (Universite de Geneve (CH)); MAR-TINELLI, Fulvio (EPFL - Ecole Polytechnique Federale Lausanne (CH)); PICARDI, Antonio (Universite de Geneve (CH)); MAGLIOCCA, Chiara (Universite de Geneve (CH)); KOTITSA, Rafaella Eleni (Universite de Geneve (CH)); FAVRE, Yannick (Universite de Geneve (CH)); FERRERE, Didier (Universite de Geneve (CH)); GONZALEZ SEVILLA, Sergio (Universite de Geneve (CH)); Dr RUCKER, Holger (IHP); DEBIEUX, Stephane (Universite de Geneve (CH))

Presenter: Mr MILANESIO, Matteo (Universite de Geneve (CH))

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