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New Developments in the design and production of Low Gain Avalanche Detectors

In this contribution we will present our new design and production of Low-Gain Avalanche Detectors fabricated at FBK, Trento, Italy. LGAD detectors are becoming increasingly popular as they combine the benefits of traditional silicon detectors with those of APDs, specifically low noise and large signals. LGAD are also particularly well suited for the design of Ultra-Fast Silicon detectors, which are silicon detectors able to measure the time of the particle hit with the precision of few tens of picoseconds.

In this new production we are proposing the traditional n-in-p LGAD design, where the multiplication happens at the segmented n electrode, together with the double-sided LGAD geometry, in which the segmentation is on the ohmic side. In addition we are also proposing a new mechanism of pixelization via AC coupling which offers very uniform electric fields together with segmented electrodes and we introduce in each pad a lateral collector ring, meant to prevent the charges produced by particles hitting the sensor periphery from generating a delayed signal. We will present first measurements and their comparison with simulation.

Primary authors: DALLA BETTA, Gian-Franco (INFN and University of Trento); PANCHERI, Lucio (U); BOSCARDIN, Maurizio (FBK Trento); Mr PATERNOSTER, giovanni (FBK)

Co-authors: RAVERA, Fabio (Universita e INFN Torino (IT)); CENNA, Francesca (Universita e INFN Torino (IT)); FERRERO, Marco (Universita e INFN Torino (IT)); OBERTINO, Maria Margherita (Universita e INFN Torino (IT)); CARTIGLIA, Nicolo (Universita e INFN Torino (IT)); SOLA, Valentina (Hamburg University (DE)); MONACO, Vincenzo (Universita e INFN Torino (IT))

Presenter: Mr PATERNOSTER, giovanni (FBK)

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