Contribution ID: **23** Type: **contributed talk**

pLGAD: A new sensor concept for low-penetrating particles

Tuesday, 18 February 2020 17:00 (20 minutes)

In contrast to High Energy Physics, where particles easily traverse the whole thickness of a silicon sensor, low-energy particles may be completely stopped in the sensor material. We propose a new pixelated silicon sensor with signal amplification for particles which deposit their entire energy in the range of hundreds of nanometers or less in silicon. The proposed sensor utilizes the iLGAD (inverted Low Gain Avalanche Detector) principle to amplify signals near the surface of the detector, but without amplifying the leakage current and its corresponding noise. As the sensor is designed for detection of low penetrating particles with high detection efficiency, special care has to be taken for the entrance window. Apart from the window being 10 - 15 nanometers thin, it also has to be homogeneous to ensure the same response to particles regardless of their position of incidence. The main motivation for the sensor is to use it for the detection of protons from neutron beta decay in the NoMoS measurement concept, where the protons have an energy well below 30 keV after post acceleration. Hence the name pLGAD (proton Low Gain Avalanche Detector). However, other potential applications of the detector include usage in neutron detection, low energy X-ray detection, medical physics and space experiments.

Primary authors: KHALID, Waleed (OEAW); VALENTAN, Manfred (HEPHY Vienna)

Co-authors: DOBLAS MORENO, Albert; Dr HIDALGO VILLENA, Salvador (Instituto de Microelectronica de Barcelona (IMB-CNM-CSIC)); Ms JIGLAU, Raluca (Austrian Academy of Sciences); MOSER, Daniel (Technische Universität Wien); Dr PELLEGRINI, Giulio (Centro Nacional de Microelectrónica (IMB-CNM-CSIC) (ES)); Dr SOLDNER, Torsten (Institut Laue Langevin); ZMESKAL, Johann (Austrian Academy of Sciences (AT)); Dr KONRAD, Gertrud (SMI & TU Wien)

Presenter: KHALID, Waleed (OEAW)

Session Classification: LGAD and Timing

Track Classification: non-HEP applications