Contribution ID: **50** Type: **Oral**

Advances in LGAD Technology for High Radiation Environments

Tuesday, 28 February 2023 16:15 (20 minutes)

LGAD sensors have proven to be an excellent solution for 4D-tracking in HEP experiments thanks to the presence of internal gain that provides good time resolution also at high fluences (up to $\sim 2 \cdot 10^{15}$ neq/cm^2). However, approaching 10^{16} neq/cm^2, the internal gain is completely lost due to the acceptor removal effect, leading to a deterioration of the time performances.
In the framework of the exFlu project, different solutions to preserve internal gain above 10^{16} neq/cm^2, and possibly up to 10^{17} neq/cm^2, have been studied: i) usage of thin substrates (in the range $15 - 45$ μm); ii) defect engineering of the LGAD gain implant, such as a carbon shield to protect the gain layer, and iii) a p/n co-implantation to obtain a compensated gain layer profile. In the latter case, the concurrent acceptor/donor removal effects, acting on Boron/Phosphorous dopant, respectively, could be advantageous in reducing the loss of gain. The final goal is to pave the way for a new sensor design that can efficiently perform precise tracking and timing measurements up to 10^{17} neq/cm^2. All these technological solutions have been implemented in the most recent R&D batch produced at FBK. Preliminary results on the sensors' characterization will be presented and discussed.

Primary authors: PATERNOSTER, Giovanni (Fondazione Bruno KEssler); SOLA, Valentina (Universita e INFN Torino (IT))

Presenter: SOLA, Valentina (Universita e INFN Torino (IT))

Session Classification: LGAD

Track Classification: LGAD