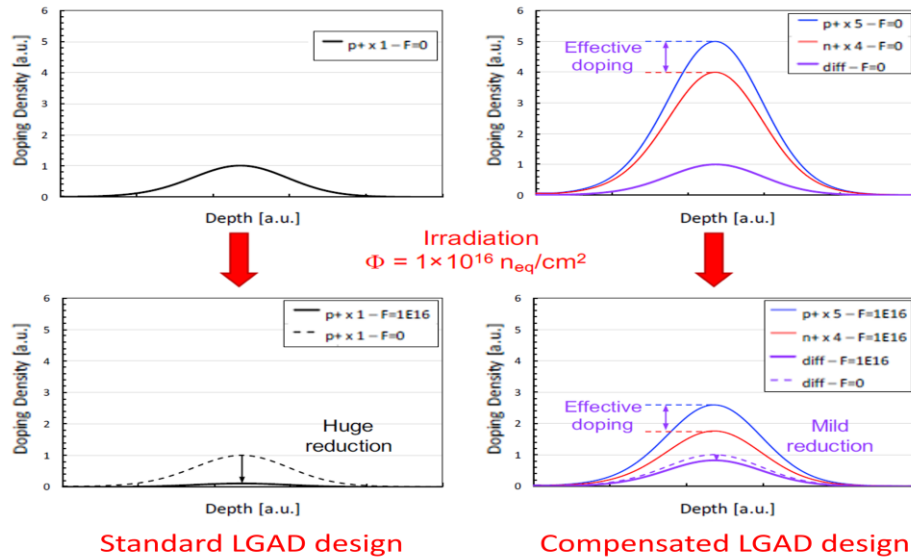


# Development and test of innovative Low-Gain Avalanche Diodes for particle tracking in 4 dimensions

T. Croci<sup>(\*)</sup>, on behalf of the “4DInSiDe” collaboration

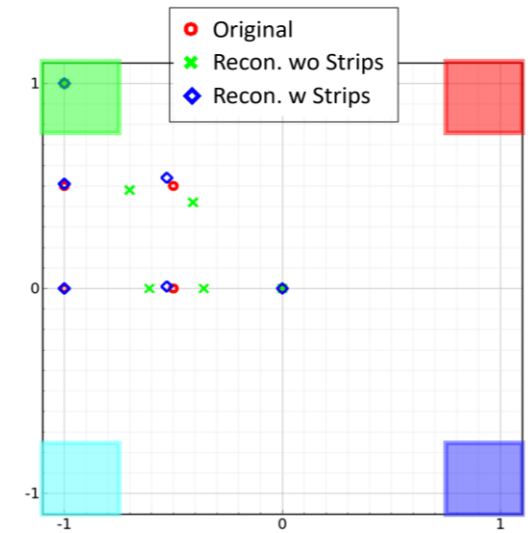
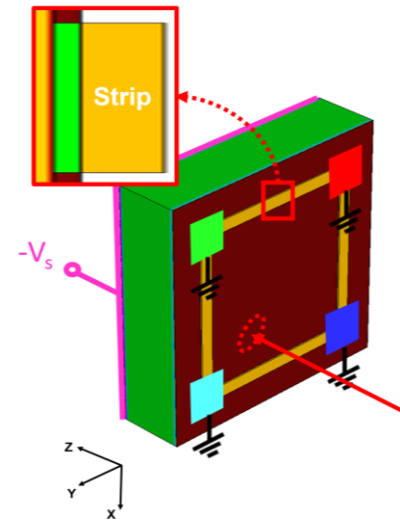
Developing innovative radiation-hard silicon detectors for 4D particle tracking in the future HEP experiments

## A compensated design of the LGAD gain layer



- New strategy to overcome the present limit of radiation tolerance for the gain implant, i.e.  $1-2 \times 10^{15} \text{ n}_{\text{eq}}/\text{cm}^2$ .
- Use the interplay between radiation induced acceptor and donor removal to keep a roughly constant gain layer active doping density after irradiation.

## DC-coupled Resistive Silicon Detectors (DC-RSD)



- DC-RSD with low resistivity strip between collecting pads, as an evolution of the RSD paradigm [1].
- Addressing few known issues (e.g. baseline fluctuation, long tail-bipolar signals) and maintaining the advantages (e.g. signal spreading over  $\sim \text{mm}$  distances, 100% fill factor).