

Latest developments for the improvement of double-sided 3D detectors fabrication at FBK

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Double-side 3D sensor technology developed at FBK (Trento, Italy) in collaboration with INFN turned out successful not only in the performance demonstration of prototypes but also to supply good quality detectors for the ATLAS-IBL with a good fabrication yield.

Although obtained results are satisfactory, the performance of these devices can be further improved and a simplification of the fabrication technology will be desirable to reduce the time required for a medium volume production.

This paper reports on the modifications at the layout and fabrication levels aimed at improving the sensor breakdown voltage, both before and after irradiation, while reducing the number of lithographic steps required during fabrication. The new adopted layout solutions will be shown together with TCAD simulations supporting them. A modified 3D technology with full passing ohmic columns and junction columns stopping at about 25 microns from the opposite surface will be introduced. Preliminary results will be reported from the electrical characterization of a new 3D detector batch fabricated at FBK and implementing the proposed improvements.

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