

Progress on the Low Resistance Strip Sensors Project

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AC-coupled silicon strip sensors can get damaged in case of a beam loss due to the possibility of a large charge accumulation in the bulk, developing very high voltages across the coupling capacitors which can destroy them. Punch-through structures are currently used to avoid this problem helping to evacuate the accumulated charge as large voltages are developing. Nevertheless, previous experiments, performed with laser pulses, have shown that these structures can become ineffective in relatively long strips. The large value of the implant resistance can effectively isolate the “far” end of the strip from the PT structure leading to large voltages. The project aims to fabricate low-resistance strips by means of the deposition of a conducting material in contact with the implants, assuring the effectiveness of the PT structures.

Summary

The Low Resistance Strip Sensors Project was approved in June 2011, since then the working group has been working on the technological and layout definition of the structures. With respect to the technological feasibility and variations several wafers have been fabricated in the CNM clean room trying a variety of technological options. The measurement performed so far have demonstrated the feasibility of the project and have given indication on the best options for the processing. With respect to the layout definition, a design of experiments have been planned to assure the functionality of the PT structures in order to be able to check their effectiveness optimization subject of the project. Miniature barrel-type strip sensors have been designed with the experiment variations, and some specifically designed test structures have also been created. At this point the final mask designs and the full process steps are being defined.

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