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Design of Punch-Through Protection of Silicon Microstrip Detector against Beam Splash

For a silicon microstrip detector to be operated in high intensity accelerator experiments, sensor protection against possible beam splash needs to be investigated. We describe a protection based on punch-through mechanism for the p-bulk sensor that is being designed for the Super Large Hadron Collider experiment.

One of the design issues is the p-stop or p-spray required for p-bulk sensors that work as a punch-through blocker. Also a field-plate is important to control the potential where the punch-through occurs.

The effectiveness of the protection was evaluated by injecting high intesity pulsed laser to mimic the splash. The transient signal shapes provide the durability requirements of the readout amplifier and of the AC coupling insulator of the sensor. The results will be reported for the sensors irradiated up to 10<15> cm<-2>.

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