



Contribution ID: 53

Type: **not specified**

Development of Silicon Detectors for Tracking and Timing within the RD50 Collaboration

Thursday, 12 April 2018 15:30 (30 minutes)

This talk summarizes the results and activities of the RD50 collaboration in the development of silicon detectors for hadron colliders. The focus of the collaboration is the improvement of the detectors' radiation hardness, with an emphasis on high-luminosity LHC applications. The radiation damage mechanisms of silicon detectors are introduced, together with the activities to develop models and simulations to describe their effects. Several detector technologies are being studied within the collaboration. Tracking detectors, both monolithic and hybrid, are under development. The hybrid detectors are produced both with planar and 3D sensors, while the monolithic devices are produced using CMOS processes. The status of the radiation hardness of these detectors is summarized. Timing detectors with intrinsic gain are also being developed. A summary of their performance and radiation hardness is given. Finally, the required R&D and a possible R&D roadmap for radiation-hard silicon detectors applications in FCC-hh are discussed.

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Session Classification: Common detector technology

Track Classification: Common detector