

Possible applications of the SiTRD technique in the next generation collider experiments

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The Silicon Transition Radiation Detector (SiTRD) combines the excellent space resolution of a silicon tracker with the particle identification capability of a conventional TRD.

The detector consists of multiple modules, each composed by a radiator and a tracker plane, separated by an air gap and immersed in a magnetic field. This layout allows to separate the TR photons possibly produced by radiating particles from their trajectories. Provided that the separation in the tracker plane is larger than the granularity of the tracker, the SiTRD can identify radiating particles from non radiating ones. Moreover, the small amount of materials encountered by the particles along their path, does not significantly affect the momentum reconstruction performance of the tracker. These features make the SiTRD an attractive option when designing the inner tracker of a collider experiment.

We have studied a possible SiTRD layout for the inner tracker of a collider experiment at LHC. The detector parameters have been optimized taking into account the geometry constraints derived from an upgrade proposal of the ATLAS inner tracker. A Monte Carlo simulation has been also developed in which the detector performances have been investigated.

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