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Solid State Detectors: Silicon Detectors (lecture 1 and lecture 2)

Silicon micro pattern detectors have paved the way for new possibilities in particle detection by precision measurements of particle tracks close to the interaction point of a collision and thus detecting short lived particles that decay after a length of typically less than a millimeter. The detectors are a text-book example for the interplay between detector, electronics and micro integration developments in recent decades and have profited much from the rapid advances in these fields.

The two lectures will cover the physics of signal generation and processing in patterned semiconductor detectors, most notably micro strip and pixel detectors, but also silicon drift detectors. A focus is placed also on the demands of high rate and radiation environments such as LHC, for which not only new sensor materials such as diamond but also monolithic approaches combining sensor and electronics in one entity are currently developed. Fundamental principles as well as concrete applications will be addressed.

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