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Detector performance of the ALICE Silicon Pixel Detector

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The ALICE Silicon Pixel Detector (SPD) forms the two innermost layers of the ALICE Inner Tracking System (ITS). It consists of two layer barrel of hybrid silicon pixel detectors at radii of 3.9 cm and 7.6 cm, respectively. The physics targets of the ALICE experiment requires that the material budget of the ITS is kept within about 1% X0. This has put some stringent constraints on the design and construction of the SPD. The material budget of the each pixel layer is 1.1%% X0, including connections and cooling. A special feature of the ALICE SPD is that it is capable of providing a prompt trigger signal, called FastOR, which can contribute to the experimental L0 trigger decision. The FastOR pixel trigger system allows to apply a set of algorithms for the trigger selection which are then sent to the Central Trigger Processor (CTP).
The detector has been installed in the experiment in summer 2007. During the first injection tests in June 2008 the SPD was able to record the very first sign of life of the LHC by registering secondary particles from the TED beam dump upstream of the ALICE experiment. In the following months the SPD has participated in the ALICE cosmic campaign with aimed to test the integration with all experimental sub-systems and to acquire data for alignment. Since the LHC start-up in November 2009, the SPD has been recording the LHC activities and in particular the first proton-proton collisions in ALICE.

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