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A new on-line luminometer and beam conditions monitor using single crystal diamond sensors

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Instrumentation near the beam-pipe requires extremely radiation hard sensors. Inside CMS two rings instrumented with 12 single crystal diamond sensors each are installed on both sides of the interaction point. The sensors are subdivided in two pads, and each pad is read out by a dedicated fast radiation hard ASIC in 130 nm CMOS technology.

Due to the excellent time resolution collision products will be separated from machine induced background. In the backend a dead-time less histogramming unit is used, and a fast micro TCA system with GHz sampling rate is under development.

The detector will measure both the on-line luminosity and the background bunch-by-bunch.

The performance of a prototype detector in a test-beam will be reported, and results from the operation during data taking will be presented.

Collaboration

CMS BRIL project

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