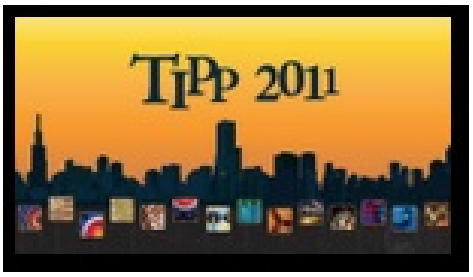

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The Beam Conditions and Radiation Monitoring System of CMS - Description and Performance of Subsystems

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The Beam Conditions and Radiation Monitoring System, BRM, is installed in CMS to protect the detector and to provide feedback to LHC on beam conditions. It is composed of several sub-systems that measure the radiation level close to or inside all sub-detectors, monitor the beam halo conditions with different time resolution. Thus it supports beam tuning and warns CMS in case of adverse beam conditions. BRM data are taken and analysed independently of the central CMS data acquisition They are displayed in both control rooms, CMS as well as LHC.

This paper shortly describes the existing system and discusses results and experience gained. It will especially focus on BCM1F, which was designed for fast flux monitoring and measuring bunch-by-bunch both beam halo and collision products. Installed inside the pixel volume close to the beam-pipe in two planes with 4 modules each (1.8 m away from the IP on both sides), it uses single-crystal CVD diamond sensors and radiation hard front-end electronics. Since November 2009 BCM1F has been recording data from beam halo, beam losses, proton-proton and lead-lead collisions and it became an invaluable tool in the everyday CMS operation. A characterization of the system on the basis of data collected during LHC operation is presented.

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