Contribution ID: **137** Type: **Poster**

Performance of the Fast Beam Conditions Monitor BCM1F of CMS in the first running periods of LHC

Thursday 23 September 2010 16:00 (2 hours)

The Beam Conditions and Radiation Monitoring System, BRM, is implemented in CMS to protect the detector and provide an interface to the LHC. Seven sub-systems monitor beam conditions and the radiation level on different time scales. They detect adverse beam conditions, facilitate beam tuning close to CMS, and measure the doses accumulated in different detector components. Data are taken and analysed independently of the CMS data acquisition, displayed in the control room, and provide inputs to the trigger system and the LHC operators.
The Fast Beam Conditions Monitor, BCM1F, is a flux counter close to the beam pipe inside the tracker volume. It uses single crystal CVD diamond sensors, radiation hard FE electronics, and optical signal transmission to measure the beam halo as well as collision products bunch by bunch. The system has been operational during the initiatory runs of LHC in September 2008, and works reliably since the restart in 2009 and is invaluable to CMS for everyday LHC operation. A characterisation of the system on the basis of data collected during LHC operation is presented.

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Session Classification: POSTERS Session