Contribution ID: **49** Type: **not specified**

The forward CASTOR calorimeter of the CMS

Tuesday 18 August 2009 14:00 (1 minute)

Please give a brief summary of your poster

The CASTOR calorimeter is designed for the very forward region (pseudorapidity range from 5.1 to 6.6) in the CMS experiment at LHC. It will be operated in the low luminosity period of pp-collisions up to 2x10^33 cm^-2s^-1 and in heavy-ion-collisions.

The design of the calorimeter is determined by space constraints inside a shield for radiation and for magnetic field and restricted to materials which tolerate a high radiation level. Therefore the calorimeter surrounds the beam pipe as a very compact sampling structure of Tungsten and Quartz plates with a depth of 10 hadronic interaction lengths. In the Quartz plates Cherenkov light is emitted by particles in the core of the electromagnetic and hadronic showers. Optimal oriented Quartz plates and air filled pyramids guide the light to photo multipliers converting the light into electrical signals. The granularity of 16 transversal segments and 14 longitudinal sections allows to reconstruct shower profiles, to separate electrons/photons from hadrons and to search for phenomena with anomalous hadronic energy depositions as expected from strangelets. With test beam measurements the main parameters of this calorimeter have been studied and results for shower profiles and energy response will be presented.

The full CASTOR calorimeter was constructed in spring 2009 and installed in June 2009. First operation experiences will be reported as well as the prospects for physics results. The physics analysis topics, which can be studied with the CASTOR calorimeter span a broad range of QCD themes. One candidate for very early physics results is the small-x evolution of the parton density functions of the proton, which will have strong impact on the LHC measurements. With the CASTOR calorimeter also the underlying event as well as the contribution to multi-parton interaction can be studied and reduce the systematic uncertainty in precision measurements as well as in searches for new physics signals. These two examples will be adressed in the poster.

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Session Classification: Poster Session

Track Classification: Poster Session