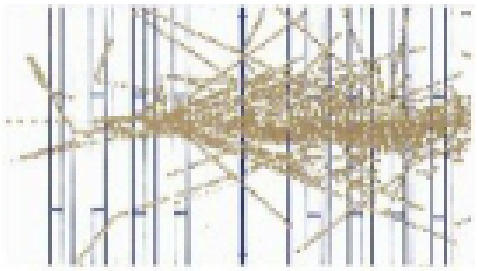

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Calibration of the electromagnetic calorimeter of the CMS detector

Monday, 26 May 2008 15:20 (20 minutes)

Summary

The Electromagnetic Calorimeter (ECAL) of CMS is a hermetic homogeneous calorimeter
made of 61200 lead-tungstate scintillating crystals readout by avalanche-photodiodes in the barrel part, closed by 7324 crystals readout by vacuum-phototrieodes in each of the two end-caps. The calibration of the relative response of the individual channels, or intercalibration, and of the absolute energy scale for electrons and photons are severe technical challenge for the operation of ECAL. The channel response uniformity within ECAL and stability in time will contribute directly to the overall energy resolution. Complex procedures based on the use of events collected during LHC operation have been designed to achieve an ultimate intercalibration precision of 0.5%. A laser monitoring system will be used to track response variations with time, as in the case of changes in crystal transparency caused by irradiation. Trigger, selection and reconstruction procedures of calibration signals and their projected performance are discussed. Results of calibrations accomplished with electron beams and cosmic rays during the commissioning phase of the detector are also reviewed. These set the intercalibration precision at the startup of LHC operation and provide a reference for validation and further development of the procedures based on physics events. Reconstruction algorithms and effects affecting the energy measurement of electron and photons, such as containment effects or issues
related to conversions and bremmstrahlung radiation in the tracker material, are also discussed.

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