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First results on the performance of the CMS Preshower Detector

The Preshower is the first part of the CMS endcap electromagnetic calorimeter, as seen by the particles. Based on silicon strip sensors, it improves the spatial accuracy of the incidence position of electromagnetic showers. This allows an additional rejection of background (e.g. neutral pions) to new physics, such as the two-photon SM Higgs decay. After a brief overview of the design of the Preshower, this presentation focuses on its performance with cosmic rays and first LHC beams. Calibration strategies are also discussed.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

In order to distinguish single photons from neutral pions in the endcaps of CMS a fine-grain Preshower detector is installed in front of the electromagnetic calorimeter. The CMS Preshower is a hybrid design, combining elements of tracking and calorimetry: about 16 square metres of silicon sensors measure the positions, energies and lateral shower shapes of incident photons and electrons. The strip width is about 1.9 mm and sufficient to distinguish single photons from two closely-spaced photons (from the decay of a neutral pion) with good efficiency over a large energy range. This is achieved by measuring the energies deposited in the strips (and thus the lateral shower shapes) over a large dynamitc range equivalent to about 450 MIPs using on-detector ASICs (PACE3). Further on-detector electronics perform digitization at 40MHz of the analogue signals from PACE3, digital data merging and optical transfer to the VME-based readout system.
A brief overview of the design of the Preshower will be given. This presentation focuses on its performance with cosmic rays (how we performed the pre absolute calibration) and first LHC beams. The detailed plans for absolute calibration and inter-calibration with CMS endcap crystal will be also discussed.

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