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**Calibration of the CMS Barrel Electromagnetic Calorimeter Using Neutral Pion Decays** MARAT GATAULLIN<sup>1</sup>, Caltech, CMS COLLABORATION — A rapid and precise calibration of the CMS electromagnetic calorimeter must be performed in situ at the LHC in order to fully exploit the physics reach of the CMS experiment. Achieving the design-goal calibration precision of 0.5% will be particularly important for a discovery of the Higgs boson in the two-photon decay channel. In this paper we evaluate the potential of a novel calibration technique that makes use of photon pairs produced in neutral pion decays,  $\pi^0 \rightarrow \gamma\gamma$ . Such photon pairs will be selected using an online filter farm from the QCD events accepted by the Level 1 triggers. Assuming a Level 1 trigger rate of 10 kHz, the rate of suitable neutral pions is found to be as high as 1 kHz. We show that 95% of the barrel electromagnetic calorimeter can be calibrated to at least a 1% (0.5%) precision after several days (weeks) of data-taking in the low-luminosity scenario of LHC,  $L = 2 \cdot 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$ . The challenges of rapid data transfer and analysis on the filter farm are also discussed.

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