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Identification of low energy photons in the CMS experiment at the LHC

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Identification of low transverse energy photons from the calorimeter energy deposits is a challenging task in a hadron collider environment. The electromagnetic calorimeter subsystem of CMS has an average noise level of about 30 MeV (80 MeV) in the Barrel (Endcap) region. The existing photon Identification scheme in proton-proton collisions for the CMS experiment is effective for photons above 8 GeV. For Heavy Ion collisions, dedicated customization of the reconstruction method has led to the identification of photons down to 2 GeV, which helped light by light scattering analysis. In the p-p collisions where the low- q^2 QCD activity is dominant, the low p_T photon multiplicity is very large. We have developed a scheme for identifying photons, as low as 4 GeV, in p-p collisions, using a multivariate technique. This development could help CMS in expanding its reach to rare radiative heavy flavor decays, such as $B_s^0 \rightarrow \mu \mu \gamma$, where more than 90 % of the decay phase has a photon less than 10 GeV. Highlights of the this study will be presented in this talk.

Session

Future Experiments and Detector Development

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