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**Covariant Matrix based  $e/\gamma$  Identification Algorithm for Higgs searches at the LHC** H. KIM, J. YU, Univ. of Texas at Arlington, ATLAS COLLABORATION — Discovery of the Higgs particle is one of the most important goals of the Large Hadron Collider (LHC) experiments. To detect the rare Higgs signal, the electromagnetic (EM) calorimeter must not only be able to precisely measure the energy of electrons and photons, but also identify them well. The discrimination against overwhelming background from jets can be achieved by measuring the detailed shapes of EM showers and by taking advantage of the correlations between shape variables. The covariant matrix technique, the H-matrix method, uses these correlations for electron and photon identifications. In this talk, we present construction of H-matrix  $e/\gamma$  identification algorithm and its performance on single, isolated electron and  $\gamma$  as well as on those from signal physics processes, along with the rejections on highly electromagnetic jets. In addition, prior to the LHC collisions, high-energy bremsstrahlung photons produced by the cosmic ray muons passing through the ATLAS calorimeter provide valuable data that can be used to validate the Monte Carlo modeling of the ATLAS detector and the performance of the photon identification algorithms. We will present the measurement of photon identification efficiency using cosmic data.

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