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Study of the ATLAS muon identification efficiency in the presence of high pile-up

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In 2012 the LHC will be operated in a mode leading to up to 40 inelastic pp collisions per bunch crossing, so-called “pile-up”. The reconstruction and identification of muons produced in a hard collisions is difficult in this challenging environment. Di-muon decays of J/psi mesons and Z bosons have been used to study the muon reconstruction and identification efficiency of the ATLAS detector as a function of the muon transverse momentum from $p_T = 4$ GeV to $p_T = 100$ GeV and the number of inelastic collisions per event. The results show a steep efficiency turn-on curve reaching its plateau value of 100% at p_T approx 6 GeV and no dependence of the muon reconstruction efficiency on the amount pile-up. The studies also reveal that the use of inner detector tracks allows us to distinguish between isolated muons and non-isolated muons produced in jets with high separation power even at the highest pile-up levels.

E-mail Address

william.robert.spearman@cern.ch

Collaboration Name
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ATLAS Collaboration

Primary author: SPEARMAN, William Robert (Harvard University (US))

Presenter: SPEARMAN, William Robert (Harvard University (US))

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