

Abstract Submitted
for the NEF21 Meeting of
The American Physical Society

Analysis of “Non-Prompt” Backgrounds in Four-Lepton Events at the LHC¹ IRIA WANG, GABRIELLA SCIOLLA, Brandeis University, ATLAS COLLABORATION — In the search for new physics beyond the Standard Model (SM), the ATLAS detector at the Large Hadron Collider (LHC) is collecting an ever-growing collision dataset requiring a precise understanding of background sources. An ideal candidate for high-precision studies of the SM are four-lepton events, which have final states of two same-flavor opposite-charge lepton pairs. These events have contributions from interesting SM processes including single Z boson production, Higgs boson production, and on-shell ZZ production, as well as sensitivity to new physics beyond the SM. However, non-prompt leptons produced by secondary hadron decays or as artifacts of mis-reconstructions contaminate the dataset and must be suppressed. These backgrounds are subject to rare detector effects and are therefore preferentially studied using data driven methods. Through comparisons with Monte Carlo simulated data, I studied a sample of collision data in which the final states include a pair of leptons, and any additional third lepton is likely to be non-prompt. I investigated the non-prompt lepton suppression methods and refined the non-prompt lepton region to reduce systematic uncertainties on background measurements.

¹Supported by US ATLAS Summer Undergraduate Program for Exceptional Researchers. Thanks to Dr. Max Goblirsch and Ms. Prajita Bhattarai for their help and mentorship.

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Date submitted: 21 Oct 2021

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