

Calibrating the Electromagnetic Calorimeter of the STAR Forward Calorimeter System using $p + p$ collision data at $\sqrt{s} = 510$ GeV data

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Abstract

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The motivation for the STAR forward upgrade is to explore a wide range of rich cold QCD physics in the very high and low regions of Bjorken x . This requires new detector capabilities in the forward rapidities ($2.5 < \eta < 4$) including a new Electromagnetic Calorimeter (ECal) in the Forward Calorimeter System (FCS). The ECal was utilized for data taking during the 2022 RHIC run. However, radiation damage has been observed and varied for different ECal towers. Reconstruction of π^0 is developed for calibrating the ECal, studying the gain correction factor for each ECal tower by iterating the π^0 reconstruction. The analysis to study the radiation damage for the whole data period and the resulting gain correction factors from the π^0 reconstruction using the $p + p$ collision data at $\sqrt{s} = 510$ GeV for each ECal tower will be presented.