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Search for Open Charm with a Combined Analysis of Single-Muon Events in the Central and Muon arms of the PHENIX detector
MIKHAIL STEPANOV, New Mexico State University, PHENIX COLLABORATION — The production of $c\bar{c}$ pairs in $p + p$ collisions at the RHIC energy is dominated by gluon-gluon fusion. Therefore the production of single muons from charm decay in polarized $p + p$ collisions is expected to be sensitive to the polarized gluon distribution in the proton. In order to develop discriminants and selection cuts for enriching the charm content of a sample of single-muon events, a multistage simulation has been conducted including the PHENIX detector response to investigate correlations between muon tracks in the Muon Arm and charged hadron/lepton tracks in the Central Arm of the PHENIX detector. Two separate simulation outputs have been produced and compared: for open charm ($c\bar{c}$) events and minimum-bias (*i.e.*, mostly light-quark) events. The goal is to develop multivariate selection criteria which can significantly enhance the charm content of a sample of single-muon events, by studying and comparing different kinematic quantities of the Muon Arm tracks and the Central Arm tracks. A leading-order simulation indicates stronger tendency for charm events to have the maximum- p_T Central-Arm and Muon-Arm tracks emitted back-to-back in azimuthal angle ϕ . More detailed simulations are planned.

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