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A PYTHIA Simulation Study of Direct-Photon- and π^0 -Triggered Hadron Correlations in p+p Collisions at $\sqrt{s_{NN}} = 200$ GeV in Comparison to STAR Data CHRISTOPHER MARBLE, Tarleton State University — Heavy-ion collisions at the Relativistic Heavy Ion Collider (RHIC) have provided evidence for the existence of a new hot and dense state of matter called the Quark-Gluon Plasma (QGP). Proton-proton (p+p) collisions provide a baseline measurement in order to understand the properties of the QGP in heavy-ion collisions. Comparisons of jet yields in Au+Au collisions to those in p+p collisions are done to determine the attenuation of hard-scattered partons in the QGP. In this study, p+p collisions are simulated at a center of mass energy $\sqrt{s_{NN}} = 200$ GeV using the PYTHIA 8.185 event generator. Jets are studied via two-particle azimuthal correlations, with the recoil jet analyzed via charged-hadron yields on the away-side ($\Delta\varphi$ approx. π) of a π^0 or a direct-photon trigger. The away-side charged-hadron per-trigger yields at mid-rapidity ($|\eta| < 1$), for transverse momenta $p_T^{assoc.} > 1.2$ GeV/c, are obtained for π^0 and direct-photon triggers for $|\eta| < 1$ and $p_T^{trig.} > 8$ GeV/c. The fraction of transverse momentum carried by triggered π^0 from its hard-scattered ancestors is studied to understand the energy imbalance between the triggered π^0 and the outgoing parton in p+p collisions. PYTHIA simulation results of the away-side charged-hadron yields, for π^0 and direct-photon triggers, are in reasonable agreement with the data collected in p+p collisions at the STAR experiment.

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