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Unveiling the Collins effect in jets with one-point energy correlators

We propose a novel method to probe the Collins effect, a key signature of the nucleon's 3D structure, using an intra-jet energy correlator. This new observable, based on the energy-weighted azimuthal distribution of hadrons within a jet, can be measured in transversely polarized proton-proton collisions at RHIC. The resulting $\sin(\phi_h - \phi_S)$ single-spin asymmetry provides a direct probe of the Collins fragmentation function, offering a new test of its universality and connecting the fields of spin physics and jet substructure. This creates a strong link between the RHIC spin program and future measurements at the Electron-Ion Collider.

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