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Study of the Track-Based systematic uncertainties of the Soft Term Missing Transverse Momentum (MET)

The large hadron collider (LHC) is unique among accelerators currently existing or under construction. It is operating at a center of mass energy of 13 TeV and an integrated luminosity of about 41.5 fb⁻¹ to enable vital discoveries. A very good measurement of the missing transverse energy, E_{miss} , is essential for many physics studies in ATLAS both for Standard Model channels and for discovering channels. Events with large E_{miss} are expected to be the key signature for new physics such as supersymmetry and extra dimensions. E_{miss} is defined as the event momentum imbalance in the plane transverse to the beam axis, where momentum conservation is expected. Such an imbalance may signal the presence of undetectable particles, such as neutrinos or new stable, weakly-interacting particles. The vector momentum imbalance in the transverse plane is obtained from the negative vector sum of the momenta of all particles detected in a proton-proton collision. The reconstruction of the E_{miss} involves combining contributions from the fully reconstructed and calibrated hard objects in the event, most of which rely on energy measurements in the calorimeters to provide some or all of the information about the object. Additionally, contributions from particles that do not pass the hard object P_t thresholds form a “soft” term. This poster presents the performance study of the E_{miss} Track-Based Soft Term. Development of a new approach to evaluate the Track-Based systematic uncertainties of the E_{miss} Soft Term is also discussed.

Summary

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