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Performance of missing transverse momentum reconstruction in ATLAS

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Abstract content
 (Max 300 words)
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The missing transverse energy plays a really important role in reconstructing events produced at hadron colliders.

Undetectable particles, such as neutrinos, pass through the matter with a negligible probability of interaction. Hence, no direct evidence of them can be measured in a general purpose detector, as ATLAS. However, the total momenta in the transverse plane to the beam axis has to be conserved and computed. In particular, it is used in searches for the Standard Model Higgs boson channels, such as: $H \rightarrow WW$, $H \rightarrow ZZ$ and $H \rightarrow \tau\tau$ for Run-I data-taking.

The benefit of using this conservation law is that an energy imbalance may signal the presence of such undetectable particles. Therefore, it becomes also a powerful tool for new physics searches at the Large Hadron Collider, such as Supersymmetry and Extra Dimensions, for Run-II data-taking period.

The missing transverse energy measurement is significantly affected by the contributions of additional proton-proton collisions superimposed on the hard physics process, so new methods have been developed to suppress such contributions for Run-II data-taking.

The performance of the missing transverse momentum reconstruction in the ATLAS detector using data collected in Run-I and studies of the expected Run-II performance are presented.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

No

Main supervisor (name and email) and his / her institution

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