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Mitigating the effect of fake missing energy using Machine learning in the ATLAS experiment

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The missing transverse momentum in the ATLAS experiment is the momentum imbalance in the plane transverse to the beam axis. That is the resultant of the negative vectorial sum of the momenta of all particles that are involved in the proton-proton collision. A precise measurement of the missing transverse energy is essential for many physics studies at the LHC, such as Higgs boson measurements and dark matter search. The result presented in this study are from the implementation of Boosted Decision tree (BDTs) based on vertex variables and fake/real missing samples. The preliminary results show the BDTs classifiers can improve signal purity to about 50% as compared to the nominal selection.

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