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Machine Learning Methods to search for a scalar partner of the top quark in all-hadronic $t\bar{t}$ -MET final states with the ATLAS detector

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The ongoing Run-3 at the LHC is providing proton-proton collision data at the record energy of 13.6 TeV and, as of May 2024, a total integrated luminosity of almost 90 fb^{-1} has been recorded by the ATLAS detector. This contribution presents preliminary results on the search for the pair production of stop squarks, the scalar supersymmetric partner of the top quark, based on the Run-2 and Run-3 data collected by the ATLAS detector, specifically focusing on the machine learning (ML) techniques that are being employed to boost the discovery potential. The main challenge that ML helps to tackle is the matching of the top decay products to the correct parent particle. A preliminary comparison between a basic feed-forward classifier for top reconstruction and a SPANet/Topograph-like architecture will be presented and finally the idea of an end-to-end classifier to discriminate between signal and background will be outlined.

Author: Mr DAL SANTO, Daniele (Universität Bern)

Co-authors: O'NEILL, Aaron Paul (Universitaet Bern (CH)); SCHEFER, Meinrad Moritz (Universitaet Bern (CH))

Presenter: Mr DAL SANTO, Daniele (Universität Bern)

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