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The use of machine learning to understand the excesses of events in SS and 3 lepton events with b-jets at the LHC

Top-quark is the known heaviest elementary particle of the Standard Model (SM) and it is said to have large couplings to hypothetical new physics in many models beyond the SM. With the mass and spin correlations of the top-quark together with W-boson helicity fractions already being measured, interesting characteristics of the top-quark are accessible due to the large center-of-mass energy and luminosity at the LHC. Based on a number of publications in leading journals, our team predicted emergence of multi-lepton anomalies at the LHC. One of these anomalies in the excess production of two same sign leptons (electron or muon), three leptons in association with b-quarks. The ATLAS and CMS experiments have reported sustained excesses in these final states. The main backgrounds for these final states is the production of top pairs in association with a W boson and the production of four tops. Here we are applying Machine Learning techniques to understand the subtle differences between SM and BSM production mechanisms is a 12 dimensional space.

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

Yes

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

MSc

Primary author: MATHAHA, Thuso (School of Physics, University of the Witwatersrand)

Co-authors: KUMAR, Mukesh (University of the Witwatersrand); MELLADO, Bruce (University of the Witwatersrand); RUAN, XIFENG (University of the witwatersrand)

Presenter: MATHAHA, Thuso (School of Physics, University of the Witwatersrand)

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