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A search for tWZ production at $\sqrt{s}$=13TeV with the ATLAS detector

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The production of a single top quark in association with a W boson and a Z boson (tWZ) is a rare Standard Model process which has never before been measured. This process will be a useful input into global Standard Model Effective Field Theory (SMEFT) fits due to its sensitivity to top-electroweak SMEFT coefficients in regions of high W boson and Z boson transverse momenta. It is also a relevant background in other top quark related measurements such as the $t\bar{t}Z$ cross section measurement. A search has been performed for tWZ production using 140fb^{-1} of proton-proton collision data at a centre of mass energy of 13 TeV. The search targets the trilepton and tetralepton final states. Regions are defined using physics object multiplicities and graph neural networks are employed to perform signal-background discrimination. The signal strength of tWZ production μ_{tWZ} is extracted using a profile likelihood fit with a full systematic model describing experimental and modelling uncertainties. Preliminary blinded measurements of μ_{tWZ} are shown for each channel using an Asimov data set. A combined signal extraction across both channels will also be presented. The measurements of μ_{tWZ} shown will include their associated expected significance and expected upper limits. Estimations of the measurements of μ_{tWZ} for higher luminosity data sets are investigated.

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

Yes

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

MSc

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