Contribution ID: **16**   Type: **not specified**

Highlights of Search for New Particles (Vector-like Quarks/Leptoquark/W'/Z')

Wednesday 17 May 2023 14:05 (25 minutes)

Many physics models beyond the Standard Model predict heavy new particles preferentially decaying to at least one top quark. This talk will present searches for Leptoquark/Vector-like quark/new resonances decaying into at least one top quark in pp collision at a center-of-mass energy of 13 TeV at the CMS and ATLAS detectors at the LHC.

The searches use the data set collected with the CMS or ATLAS detectors in 2016-2018, which corresponds to an integrated luminosity of 138 fb−1. Novel machine learning techniques and reconstruction techniques are used to optimize discrimination of top quarks with high Lorentz boosts, which requires the use of non isolated leptons and jet substructure techniques, as well as allowing for a significant improvement of the analysis sensitivity compared with earlier results. No significant excess of events relative to the expected yield from standard model processes is observed. The most stringent limits to date are obtained from these searches.

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Session Classification: Collider