Contribution ID: **461** Type: **Poster**

Novel broad-mass search for new scalar particles in FCNC top quark decays using the full Run 2 data of the ATLAS detector

Friday, 8 July 2022 20:10 (20 minutes)

No analysis in ATLAS or CMS has so far searched for FCNC decays of top quarks into a new scalar (X) in a broad mass range probing branching ratios below 10^{-3}. In the case of the Higgs boson, branching ratios $t \to H + u/c$ are predicted within the SM to be of about $O(10^{-17})/O(10^{-15})$. Several beyond-SM theoretical models predict new particles and enhanced branching ratios. In particular, simple SM extensions involve the Froggatt-Nielsen mechanism, which introduces a scalar field with flavour charge, the so-called flavon, featuring flavour violating interactions. Using the full Run 2 data, ATLAS has performed a search for a scalar of a mass in the range between 20 and 160 GeV and decaying into a pair of bottom quarks. In order to distinguish signal from background, a feed-forward neural network that uses kinematic variables together with various invariant masses of pairs of b-jets is used in the fits for the various mass hypotheses. The method, strategy and preliminary results for both FCNC decays $t \to cX$ and $t \to uX$ will be presented.

In-person participation

Yes

Presenter: ORLANDO, Nicola

Session Classification: Poster Session

Track Classification: Beyond the Standard Model