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Search for vector-like quarks with the ATLAS Experiment

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A search for vector-like quarks is presented, which targets their decay into a Z boson and a third-generation Standard Model quark. In the case of a vector-like quark T (B) with charge $+2/3e$ ($-1/3e$), the decay targeted is $T \rightarrow Zt$ ($B \rightarrow Zb$). A dataset corresponding to 139/fb of pp collisions at $\sqrt{s} = 13$ TeV, collected between 2015 and 2018 with the ATLAS detector during Run 2 with the Large Hadron Collider, is used for this search. The targeted final state is characterised by the presence of a Z boson with high transverse momentum, which is reconstructed from a pair of opposite-sign same-flavor leptons, as well as b-tagged jets.

A study about the transferability of deep learning models in searches for new physics will also be shown. In it may be seen that using deep neural networks in search for new physics still leads to sensitivity for other BSM signals not present during training.

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