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P5' anomaly for top: tZ' associated production at LHC

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The LHCb experiment uncovered the P5' anomaly, a deviation in data from Standard Model expectations in the said $B \rightarrow K^* \mu \mu$ angular observable. This has motivated a possible Z' boson that couples to left-handed b to s transitions, where a model would be the gauged $L_\mu - L_\tau$ symmetry, but direct search for such a Z' is not promising. Less constrained is a similar Z' , but coupling to right-handed t to c transitions. Motivated by this, we study $cg \rightarrow tZ'$ associated production at LHC, both for a generic model, and in the $L_\mu - L_\tau$ with a vector-like U quark as its realization. We also study $c\bar{c} \rightarrow Z'$ production that would exist within the model. Both processes can be probed already by LHC Run 2 data, all the way up to the HL-LHC.

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