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Test of global symmetries of the SM in the top quark sector

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The pursuit of deviations from the Standard Model (SM) is prompted by the recognition of the model's known limitations. Some findings suggest possible violations of lepton universality. The identification of such deviations could potentially lead to a SM extension, adding Z' boson that interacts with leptons in a different manner.

The SM is also firmly grounded by the principle of Lorentz invariance. Nevertheless, some theories predict a non-conservation of this symmetry, a possibility considered within the framework of the Standard Model Extension (SME).

In this presentation, I will share my research on testing these symmetries. Firstly, I will discuss my work regarding the search for lepton universality violations in $t\bar{t}Z \rightarrow l^+l^-$ decays using CMS data. Next, I will present my result on the test of Lorentz invariance by analysing photon decays in vacuum at the Large Hadron Collider (LHC)

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