## Phenomenology 2022 Symposium: From Virtual to Real



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## Explaining lepton-flavor non-universality and self-interacting dark matter with $L_{\mu} - L_{\tau}$

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Experimental hints for lepton-flavor universality violation in the muon's magnetic moment as well as neutraland charged-current *B*-meson decays require Standard-Model extensions by particles such as leptoquarks that generically lead to unacceptably fast rates of charged lepton flavor violation and proton decay. We propose a model based on a gauged  $U(1)_{L_{\mu}-L_{\tau}}$  that eliminates all these unwanted decays by symmetry rather than finetuning and efficiently explains  $(g-2)_{\mu}$ ,  $R_{K^{(*)}}$ ,  $R_{D^{(*)}}$ , and neutrino masses. The  $U(1)_{L_{\mu}-L_{\tau}}$  furthermore acts as a stabilizing symmetry for dark matter and the light Z' gauge boson mediates velocity-dependent darkmatter self-interactions that resolve the small-scale structure problems. Lastly, even the Hubble tension can be ameliorated via the light Z' contribution to the relativistic degrees of freedom.

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