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## Probing the $L_\mu-L_\tau$ Gauge Boson at the MUonE Experiment

Monday 27 June 2022 16:40 (20 minutes)

This talk is based on our recent paper arXiv:2109.10093.

The MUonE collaboration intends to assess the hadronic vacuum polarization contribution to the muon  $g-2$  via the elastic scattering process  $\mu e \rightarrow \mu e$ . I will discuss the prospects of probing the  $L_\mu-L_\tau$  gauge boson at the MUonE experiment. The  $L_\mu-L_\tau$  gauge boson  $Z$ , which can explain the reported muon  $g-2$  discrepancy, can be produced at the MUonE experiment through the process  $\mu e \rightarrow \mu e Z$ . The background events coming from the elastic scattering  $\mu e \rightarrow \mu e$  as well as radiative process  $\mu e \rightarrow \mu e \gamma$  can be removed by the kinematical cuts on the muon scattering angle and the electron energy, in addition to a photon veto. With our selection criteria, the number of signal events  $\mu e \rightarrow \mu e Z$  is found to be as large as  $10^3$  in the parameter region motivated by the muon  $g-2$  discrepancy. Our result shows that the MUonE experiment is also sensitive to new physics and therefore it can serve a double purpose.

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