

# In search of New Physics with Lepton Flavor Violation in $\Upsilon(3S) \rightarrow e^\pm \mu^\mp$

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Although unobservable in the standard model, charged lepton flavour violating (LFV) processes are predicted to be enhanced in new physics extensions. We present the final results of a search for electron-muon flavour violation in  $\Upsilon(3S) \rightarrow e^\pm \mu^\mp$  decays using data collected with the BaBar detector at the SLAC PEP-II  $e^+e^-$  collider operating with a 10.36 GeV centre-of-mass energy. The search was conducted using a data sample of 118 million  $\Upsilon(3S)$  mesons from 27 fb<sup>-1</sup> of data and is the first search for electron-muon LFV decays of a b quark and b antiquark bound state. No evidence for a signal is found, and we set a limit on the branching fraction of  $\Upsilon(3S) \rightarrow e^\pm \mu^\mp$  and interpret it as a limit on the energy scale divided by the coupling-squared of relevant LFV new physics (NP):  $\Lambda_{NP}/g_{NP} > 80$  TeV.

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