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Dark sectors and enhanced $h \rightarrow \tau\mu$ transitions

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LHC searches with τ leptons in the final state are always inclusive in missing-energy sources. A signal in the flavor-violating Higgs decay search, $h \rightarrow \tau\mu$, could therefore equally well be due to a flavor conserving decay, but with an extended decay topology with additional invisible particles.

In this talk, I demonstrate this with the three-body decay $h \rightarrow \tau\mu\varphi$, where φ is a flavorful mediator decaying to a dark-sector.

This scenario can give thermal relic dark matter that carries lepton flavor charges, a realistic structure of the charged lepton masses, and explain the anomalous magnetic moment of the muon, $(g - 2)\mu$, while simultaneously obey all indirect constraints from flavor-changing neutral currents. Another potentially observable consequence is the broadening of the collinear mass distributions in the $h \rightarrow \tau\mu$ searches.

Summary

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