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Hidden Photons in light of g-2

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Recently, the Muon g-2 collaboration released their first result of the muon anomalous magnetic moment $(g-2)_\mu$ measured with the E989 experiment at Fermilab. When combined with previous data this result confirms a 4.2 σ excess over the Standard Model prediction. In light of this exciting news an anomaly-free $U(1)_{L_\mu - L_\tau}$ allows for an explanation of $(g-2)_\mu$ with a novel MeV-mass hidden photon. Focussing on neutrino interactions, I will present a dedicated strategy of how to combine measurements from muon beam, coherent neutrino-nucleus scattering and direct detection experiments to independently confirm $U(1)_{L_\mu - L_\tau}$ as a solution to $(g-2)_\mu$ and discriminate it from a simplified muon-coupled $U(1)_{L_\mu}$ mediator.

Author: FOLDENAUER, Patrick

Presenter: FOLDENAUER, Patrick

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