

Phenomenology 2022 Symposium: From Virtual to Real



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Dark Photons and Displaced Vertices at the MUonE Experiment

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MUonE is a proposed experiment designed to measure the hadronic vacuum polarization contribution to muon $g-2$ through elastic $\mu-e$ scattering. As such it employs an extremely high-resolution tracking apparatus. We point out that this makes MUonE also a very promising experiment to search for displaced vertices from light, weakly-interacting new particles. We demonstrate its potential by showing how it has excellent sensitivity to dark photons in the mass range $10 \text{ MeV} \leq m_{A'} \leq 100 \text{ MeV}$ and kinetic mixing parameter $10^{-5} \leq \epsilon e \leq 10^{-3}$, through the process $\mu^- e^- \rightarrow \mu^- e^- A'$ followed by $A' \rightarrow e^+ e^-$.

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