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Search for Long-lived Particles in the ATLAS Muon Spectrometer

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A search for highly displaced vertices resulting from the decay of neutral long-lived particles produced by proton-proton collisions at $\sqrt{s} = 13$ TeV using 140 fb^{-1}of data collected by the ATLAS experiment is in progress. Such long-lived particles are predicted by several beyond the Standard Model theories. Benchmark models used in the analysis will be discussed. For displaced vertices that occur in the ATLAS Muon Spectrometer, three distinct experimental signatures are used. Preliminary results on optimizing the selection criteria for signal will be shown. The expected signal cross section limit reach for long-lived particles decaying in the Muon Spectrometer as a function of lifetime will be reported. Further possible improvements in the analysis will be discussed.

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