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Probing dark sectors with the SpinQuest experiment

Tuesday, 21 July 2020 14:00 (15 minutes)

The SpinQuest (Fermilab-E1039) experiment is designed to identify Drell-Yan production of μ+μ− pairs from 120 GeV/c proton interactions. In the next 10 minutes, I will present the exciting ideas for reusing and repurposing the E1039 spectrometer to detect sub-GeV dark-sector particles: a collection of particles that are not charged under the Standard Model forces, and only couple feebly to the SM. These particles can be produced in the high-intensity proton environment and, due to their long lifetime, their decay into muons may result in a meter-scale lab-frame displacement. I will discuss the status of the displaced-vertex trigger needed to identify the signal and the predicted physics reach of the upcoming dimuon run. I will also give a glimpse of future prospects for extending the reach to lower particle masses by also identifying dielectron decays.

Summary

This talk advertises exciting future prospects of using a Fermilab proton fixed-target experiment to detect dark sector particles. The experimental effort is just starting and welcomes new-comers!

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