

Abstract Submitted
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Vector-Portal Search for Long Lived Dark Matter Particles¹

MEHDI RAHMANI , MARCUS HOHLMANN , Florida Inst of Tech, COMPACT MUON SOLENOID (CMS) COLLABORATION — Experimentally, dark matter has not yet been observed, and there is not yet any evidence for non-gravitational interactions between dark matter and Standard Model particles. Since dark matter particles themselves do not produce signals in the Large Hardon Collider (LHC) detectors, one way to observe them is when they are produced in association with visible standard model particles such as muons, through a spin 1 mediator, e.g. a dark Z-like boson Z_D , that interacts with the Standard Model sector as well as the dark matter sector. Dark matter particles may have lifetimes that produce secondary decay vertices in collider experiments that are substantially displaced from the primary interaction vertex. We are preparing two models, involving dark scalars ($pp \rightarrow Z_D \rightarrow S_D \bar{S}_D$) and dark fermions ($pp \rightarrow Z_D \rightarrow F_{D_1} F_{D_1} \rightarrow F_{D_2} F_{D_2} \mu^+ \mu^-$), as reference models for a search for long-lived dark matter particles with the Compact Muon Solenoid (CMS) detector at the LHC. In this talk the status of Monte Carlo production and the kinematics of the generated events will be discussed. We will also outline our strategy for conducting this search using the full Run 2 CMS data set.

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