

A tri-muon trigger for pair-production of dark photons with the CMS Experiment at the HL-LHC

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Pair production of dark photons is predicted from models of supersymmetry. When both dark photons decay into muon pairs, a trigger selection with three muons can be highly efficient for GeV-scale dark photons. We report the results of a simulation study of the CMS detector for p-p collisions at 14 GeV with average pile-up (interactions per bunch crossing) of 200. In this study, the dark photons have mass 1 GeV and they are promptly produced (originating from the primary vertex). Efficiency of 90% is obtained for events when the muon with the third largest pT is in the range 5-10 GeV. Efficiency approaches 100% when the third largest muon pT exceeds 40 GeV. The tri-muon trigger provides large increases in efficiency over single and double muon triggers for third largest muon with pT in the range 5 GeV to 40 GeV.

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