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Hitting two BSM particles with one lepton-jet: search for a top partner decaying to a dark photon, resulting in a lepton-jet

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A maverick top partner model, decaying to a dark photon was suggested. The dark photon decays to two overlapping electrons for dark photon masses of 100 MeV, and results in a so-called lepton-jet. Leptons jets are mostly unexplored objects in collider searches, and no hints of new physics so far at the LHC makes these unusual topologies attractive. The event includes a top quark as well, which results in events with two boosted objects, one heavy and the other ultra-light. We propose a search strategy exploiting the unique signal topology. We show that for a set of kinematic selections, both in hadronic and leptonic decay channel of the SM top quark, almost all background can be eliminated, leaving enough signal events up to top partner mass of about 3 TeV for the search to be viable at the LHC.

In-person participation

Yes

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