Abstract Submitted
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A Stop Decay Search Using Jet Substructure[1] JACKSON OLSEN, William & Mary Coll, CMS COLLABORATION — A possible extension of the Standard Model is Supersymmetry, which partners every Standard Model particle with a Supersymmetric particle. Should such partner particles exist, experiment and theory indicate that the Large Hadron Collider at CERN will have the capability to produce them when it begins its second major data collection run at a 13 TeV center-of-mass energy. A possible method of detection is through the production and decay of the top quark's Supersymmetric partner, the stop squark. Simulations of a heavy stop decay to a light stop and a Higgs boson are performed. A likely decay of the Higgs boson is to two W bosons. A feature of this process is a high number of cascades of particles known as jets. Due to an anticipated heavy stop mass of upwards of 1 TeV, the lighter decay products become relativistically boosted, leading to closely clustered bursts of particles that may become merged into a single jet within the CMS detector by typical reconstruction techniques. Simulated data is analyzed to determine the efficacy of variables that discriminate between jets with substructure and background jets produced by normal quark-gluon interactions. Further, the jets originating from the stop decay should possess masses very nearly the mass of the particles from which they have decayed. Background particles from other interactions, called pileup, blur these masses, and techniques are explored to remove these extraneous particles from the final analysis.

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