

Title: Jet Substructure and Searches for New Physics at the LHC

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Abstract: The LHC is offering our first glimpses of physics at energies above a TeV, allowing us an unprecedented chance to search for very heavy new particles from electroweak compositeness, new gauge forces, extra dimensions, and supersymmetry. Some of the most interesting signals involve decays into Standard Model particles that we are used to thinking of as "heavy": W/Z bosons, top quarks, and perhaps Higgs bosons. However, at genuinely TeV-scale energies, these SM particles with  $O(100 \text{ GeV})$  mass are produced with relativistic velocities. Consequently, their own decay products are Lorentz-boosted into very collimated configurations, and can look uncomfortably similar to the jets of particles that are copiously produced by QCD at hadron colliders. The past several years have witnessed a surge of ideas for how to uncover these challenging signals by carefully organizing the patterns of radiation observed in the LHC detectors, an approach called Jet Substructure. I will discuss some of these recent ideas, and show a handful of important applications to searches for new physics.

