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Jet substructure measurements at CMS, including heavy ions

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A number of measurements are presented that utilize and/or investigate jet substructure.

The measurement of top production and the investigation of its properties in the boosted regime is gaining increasing attention with the rapid increase of the production cross sections at 13 TeV. The CMS experiment has measured the production cross section as function of the transverse momentum and rapidity of the (anti)top quark in final states containing one charged lepton at 8 TeV and no leptons at 13 TeV. These measurements extend the reach of the ones performed in the regime where the objects from the top quark decays are resolved and are compared to the latest fixed order prediction calculations as well as to state-of-the-art MCs. In addition to these the first measurement of the differential cross section as function of the top jet mass, and the extraction of the top quark mass in the boosted regime is presented.

Measurements of the differential cross section of dijets with respect to jet mass and p_t , as well as the measurement of the jet charge, are also presented. These provide important tests of QCD in the jetty regime. The jet mass measurement is computed for ungroomed jets, and also for jets groomed with the soft drop algorithms, providing the capability to compare to theoretical predictions of the jet mass for the first time at a hadron collider.

Results using jet substructure are also included from heavy ion collisions, including the jet fragmentation and mass.

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