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Study of QCD Using Event Shape Variables in pp Collisions at /s = 13TeV

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Quantum Chrmodynamics is an important subject of study at the colliding beam experiments. Event-Shape Variables (ESVs) are functions of the four-momenta of particles in hadronic final states and are theoretically robust. They are sensitive to both perturbative and non-perturbative aspects of QCD and help us understand the flow of energy in an event. They may also be used in search of new phenomena. Here we present results on the measurement of four ESVs in events with multiple jets using proton-proton collision data collected by the CMS at the Large Hadron Collider at the centre of mass energy of 13TeV. Data are compared with general-purpose Monte Carlo event generators: Pythia8, HERWIG++, and MadGraph5 MC@NLO which use different theoretical models of QCD. The parton shower and hadronization have been studied in details for future tuning of the parameter set of Pythia8. We also study Pythia8 extensively to figure out the dependence of the ESVs on strong coupling constant(αS) through the initial-state (ISR) and final-state (FSR) radiations. Finally, we use RIVET and Professor framework to estimate some optimum values for αS corresponding to these shower kernels so that Pythia8 describe the data better.

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