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Prospects for a measurement of the W boson mass in the all-jets final state at hadron colliders

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Precise measurements of the mass of the W boson are important to test the overall consistency of the Standard Model of particle physics. The current best measurements of the W boson mass come from single production measurements at hadron colliders in its decay mode to a lepton (electron or muon) and a neutrino and pair production of W bosons at lepton colliders, where also the decay mode of the W boson to a quark anti-quark pair has been considered. In this study, prospects for a measurement of the W boson mass in the all-jets final state at hadron colliders are presented. Compared to other methods for measuring the W mass, a measurement in the all-jets final state would be complementary in methodology and have systematic uncertainties orthogonal to previous measurements. We have estimated the main experimental and theoretical uncertainties affecting a measurement in the all-jets final state making use of jet substructure techniques.

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