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Distinguishing dijet resonances at the LHC using jet energy profiles

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Anticipating that a dijet resonance could be discovered at the 14 TeV LHC, we present a method to discern whether it is a quark-antiquark ($q\bar{q}$), quark-gluon (qg), or gluon-gluon (gg) resonance, which is based on the study of the energy profiles of the two leading jets in the dijet channel. Including statistical uncertainties in the signal and the QCD backgrounds, we show that one can distinguish, in a model-independent way, between $q\bar{q}$, qg , and gg resonances; an evaluation of systematic uncertainties in the measurement of the jet energy profile will require a detailed detector study once sufficient 14 TeV dijet data are in hand.

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