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Measurements of dijet azimuthal decorrelations and extraction of α_S at ATLAS

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The production of jets at hadron colliders provides stringent tests of perturbative QCD. We present a measurement of the rapidity and transverse momentum dependence of dijet azimuthal decorrelations, using the quantity $R\Delta\phi$. This quantity specifies the fraction of the inclusive dijet events in which the azimuthal opening angle of the two jets with the highest transverse momenta is less than a given value of the parameter $\Delta\phi_{\text{max}}$. $R\Delta\phi$ is measured in proton-proton collisions at $\sqrt{s}=8$ TeV as a function of the dijet rapidity interval, the event total scalar transverse momentum, and $\Delta\phi_{\text{max}}$. Predictions of a perturbative QCD calculation at next-to-leading order in the strong coupling with corrections for non-perturbative effects describe the data well in the whole kinematic region. The data are used to determine the strong coupling α_S and to study its running for momentum transfers from 260 GeV to above 1.6 TeV. An analysis that combines data at all momentum transfers results in $\alpha_S(m_Z)=0.1127-0.0027+0.0063$.

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