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Measurement of the \phi_{\eta}* distribution of muon pairs with masses between 30 and 500 GeV in 10.4 fb−1 of p\bar{p} collisions

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We present a measurement of the distribution of the variable \phi_{\eta}*for muon pairs with masses between 30 and 500 GeV, using the complete Run II data set collected by the D0 detector at the Fermilab Tevatron proton-antiproton collider. This corresponds to an integrated luminosity of 10.4 fb^{−1} at \sqrt{s}= 1.96 TeV. The data are corrected for detector effects and presented in bins of dimuon rapidity and mass. The variable \phi_{\eta}* probes the same physical effects as the Z/γ* boson transverse momentum, but is less susceptible to the effects of experimental resolution and efficiency. These are the first measurements at any collider of the \phi_{\eta}* distributions for dilepton masses away from the Z/γ* \rightarrow l^{+}l^{-} boson mass peak. The data are compared to QCD predictions based on the resummation of multiple soft gluons.

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