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The Structure of Charm Jets and the Dead Cone Effect in Deep-Inelastic Scattering measured with the H1 detector at HERA

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The structure of charm jets in deep-inelastic scattering is studied with the H1 detector at HERA using an integrated luminosity of 50 pb^{-1} . The analysis is performed in the phase space region $2 \leq Q^2 \leq 100 \text{ GeV}^2$ and $0.05 \leq y \leq 0.7$. Charm events are tagged by a D^* -meson required to have a transverse momentum $p_{T,D^*} > 1.5 \text{ GeV}$ and a pseudorapidity $|\eta_{D^*}| < 1.5$. Furthermore, the events are required to have at least one jet containing the D^* -meson (D^* Jet). If there is a second jet ($OtherJet$) in the event, it must have, like the D^* Jet, $p_{T,Jet} > 1.5 \text{ GeV}$ and $|\eta_{Jet}| < 1.5$. The structure of the D^* Jet and the $OtherJet$ is investigated by measuring jet shape variables and subjet multiplicities. In addition the angle of subjets with respect to the jet axis of the D^* Jet and the $OtherJet$ is used to study gluon radiation at the parton level. Study of the latter distribution as well as the derived one of a characteristic angle $\alpha_0 E_{Jet}$ as a function of E_{Jet} is motivated by the expected suppression of soft gluon radiation from heavy quarks, the so-called "Dead Cone" effect, predicted in QCD. In all distributions differences between the D^* Jet and the $OtherJet$ are observed. The data are found to be well described by the QCD model for charm production, which includes the suppression of soft gluon radiation, as implemented in RAPGAP 2.8 and JETSET 7.4. Various checks and an analysis using higher statistics are presented in order to get a better understanding of the contribution from the "Dead Cone" effect to the $\alpha_0 E_{Jet}$ vs. E_{Jet} distribution.

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