Leading Particle Production in Light Flavour Jets

The OPAL Collaboration

Abstract

The energy distribution and type of the particle with the highest momentum in quark jets are determined for each of the five quark flavours making only minimal model assumptions. The analysis is based on a large statistics sample of hadronic Z^0 decays collected with the OPAL detector at the LEP e^+e^- collider. These results provide a basis for future studies of light flavour production at other centre-of-mass energies. We use our results to study the hadronisation mechanism in light flavour jets and compare the data to the QCD models JETSET and HERWIG. Within the JETSET model we also directly determine the suppression of strange quarks to be

$$\gamma_{\mathrm{s}} \;=\; 0.422 \pm 0.049(\mathrm{stat.}) \pm 0.059(\mathrm{syst.})$$

by comparing the production of charged and neutral kaons in strange and non-strange light quark events. Finally we study the features of baryon production.

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