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A measurement of the QCD colour factor ratios C_A/C_F and T_F/C_F from angular correlations in four-jet events

The OPAL Collaboration

Abstract

From 1 105 045 hadronic Z^0 decays observed with the OPAL detector at the LEP e^+e^- collider, 21 732 four-jet events are selected. A simultaneous fit of three selected angular variables from these events by the second order QCD matrix element calculation yields

$$C_A/C_F = 2.11 \pm 0.16(\mathrm{stat.}) \pm 0.28(\mathrm{syst.})$$

$$T_F/C_F = 0.40 \pm 0.11(\mathrm{stat.}) \pm 0.14(\mathrm{syst.})$$

for the ratios of colour factors, in agreement with SU(3) expectations of $C_A/C_F = 9/4$ and $T_F/C_F = 3/8$.

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