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Alpha_s determination from the C-parameter distribution

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For the e^+e^- C-parameter we use soft-collinear effective theory to derive a factorization theorem, and then compute the cross section at N³LL + $O(\alpha_s^3)$. Differences with Thrust are highlighted. Our result holds for C in the peak, tail, and far tail regions, and we treat hadronization effects using a universal nonperturbative soft function defined in field theory. We analyze all available C-parameter tail data and obtain a global fit for $\alpha_s(m_Z)$ and one nonperturbative parameter Ω_1^C with χ^2/dof close to 1. These C-parameter results for $\alpha_s(m_Z)$ and Ω_1 are in excellent agreement with earlier results from thrust. Furthermore, for the first time we include hadron mass effects in the analysis of thrust and C-parameter experimental data.

Summary

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