RESUMMATION OF RUNNING COUPLING EFFECTS IN SEMILEPTONIC B DECAYS AND EXTRACTION OF $|V_{cb}|$

P. Ball, M. Beneke, V. M. Braun

We present a determination of $|V_{cb}|$ from semileptonic B decays that includes resummation of supposedly large perturbative corrections, originating from the running of the strong coupling. We argue that the low value of the BLM scale found previously for inclusive decays is a manifestation of the renormalon divergence of the perturbative series starting already in third order. A reliable determination of $|V_{cb}|$ from inclusive decays is possible if one either uses a short-distance b quark mass or eliminates all unphysical mass parameters in terms of measured observables, such that all infra-red contributions of order $1/m_b$ cancel explicitly. We find that using the $\overline{\rm MS}$ running mass significantly reduces the perturbative coefficients already in low orders. For a semileptonic branching ratio of 10.9% we obtain $|V_{cb}|(\tau_B/1.50\,\text{ps})^{1/2} = 0.041 \pm 0.002$ from inclusive decays, in good agreement with the value extracted from exclusive decays.

REFERENCE

Ball P., Beneke M., Braun V.M. //Phys.Rev., 1995. **D52**. 3929.

INSTANTON-INDUCED PRODUCTION OF QCD JETS

I. I. Balitsky, V. M. Braun

We consider the instanton contributions for the production of a gluon jet with large transverse momentum in QCD. We find that Mueller's corrections corresponding to rescattering of hard quanta are likely to remove the contributions of large instantons, making this cross section well defined. This observation generalizes the previous discussion of instanton effects in deep inelastic scattering and suggests that all hard processes in QCD receive hard non-perturbative corrections from instantons of small size, of order $\rho \sim 1/(Q\alpha_s)$.

REFERENCE

Balitsky I.I., Braun V.M. //Phys.Lett., 1995. **B346**. 143.