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References guide to original works

In this chapter, we give a compilation of the different Wilson coefficients, as applications of the discussions in the previous chapter.[1] In order to minimize the missprint errors in the transcription of the formulae, we have used as much as possible the transfer of the formulae from the original files. These QCD two-point functions are useful for further uses in high-energy physics processes ($e^+e^- \to$ hadrons total cross-section, Higgs decays, ...), and not only for the QCD spectral sum rules analysis.

31.1 Electromagnetic current

- Historically, the electromagnetic spectral function has been obtained to order α in QED [318,319].
- In the massless quark limit, the order α_s^2 correction has been obtained by [317], while the order α_s^3 terms have been computed in [321]. The order α_s^4 terms have been estimated [178] using the principle of minimal sensitivity (PMS) [176] and effective charge (ECH) approaches [177], or using τ decay data [332]. The order $\alpha_s^4 n_f^2$ has been computed recently in [438].
- The non-perturbative corrections were orginally obtained by SVZ [1]. Radiative corrections to the non-perturbative quark condensate have been calculated for the first time in [439].
- This observable is the most accurate quantity known in QCD today.

31.2 (Pseudo)scalar and (axial-)vector currents

- The results for the bilinear (pseudo)scalar and (axial)-vector quark correlators come essentially from [325,399,440,441,444].
- The α_s correction to the massless pseudoscalar correlator as well as the non-perturbative corrections were computed for the first time in [167]. The α_s^2 term has been obtained in [445]. The α_s^3 correction has been obtained in [446].

31.3 Quark mass corrections to the (pseudo)scalar and (axial)-vector quark correlators

- Quark mass corrections to the quark current–current correlators have been calculated to higher orders in [325,399,440,441], where it has been emphasized that the perturbative terms resulting from the relation between the normal and non-normal ordered quark condensates are essential for removing the mass logarithms singularities.

[1] This list of references might not be complete but only representative.

https://doi.org/10.1017/9781009290296.043 Published online by Cambridge University Press

- The complete α_s correction to the massive (pseudo)scalar and (axial-)vector correlator has been evaluated in [399], while the α_s^2 corrections come from [448,449].

31.4 Tachyonic gluon corrections to the (pseudo)scalar and (axial)-vector quark correlators

- Dimension two contributions due to tachyonic gluon mass have been obtained for the first time in [161].

31.5 Tensor quark correlators

- The correlator associated to the quark tensor current has been evaluated in [357,451]. It has been revised and corrected in [452].

31.6 Baryonic correlators

- Radiative corrections and non-perturbative effects to the light baryonic correlators have been calculated in [424–430].
- Correlators of heavy baryons have been evaluated in [453,454].

31.7 Four-quark correlators

- The two-point correlator associated to the four-quark current has been evaluated in [465,466] for analysing the four-quark states.
- Analogous correlators have been evaluated for the study of the $\Delta S = 2$ [467,468] and $\Delta I = 1/2$ kaon weak decays [469,470]. These results have been revised in [471].
- Similar correlators for the analysis of the $\bar{B}B$ mixing have been obtained in [472] to lowest order and including non-perturbative corrections. Radiative corrections including non-factorizable ones have been evaluated in [473]. $SU(3)$ breaking corrections are given in [474].

31.8 Gluonia correlators

- Radiative perturbative corrections to the bilinear gluonic correlators have been computed in [455], while the non-perturbative terms have been obtained in [382,456].
- The two-point correlator associated to three-gluonic current including non-perturbative corrections has been computed in [457].
- The off-diagonal quark-gluon two-point correlators have been calculated in [458,450,457].

31.9 Hybrid correlators

- The two-point correlator associated to the hybrid massless quark and gluonic current has been calculated in [459,460], where the final correct expression is given in [461]. The contribution of the tachyonic gluon acting as a new operator of dimension two has been obtained in [462].
- Two-point correlator associated to the heavy hybrid meson have been calculated in [463]. The contribution of the tachyonic gluon has been obtained in [464].