

# Singlet Contribution to the Vector Correlator

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We compute, for the first time, the order  $\alpha_s^4$  contribution to the singlet Adler function for the case of a generic colour gauge group. Giving access to the terms proportional to the squared sum of the quark charges, this result completes the  $\alpha_s^4$  corrections to the familiar R-ratio as measured in electron-positron annihilation. Adopting the colour factors to the U(1) group, the full five-loop QED beta-function is completed. An independent calculation leads to the singlet contribution of order  $\alpha_s^4$  to the Gross-Llewellyn Smith sum rule. Relating Adler function and sum rule through the generalized Crewther relation leads to two non-trivial constraints which are indeed fulfilled. This cross check gives additional confidence in the correctness of this highly complicated calculation.

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