Erratum

Order α_s QCD corrections to the Burkhardt-Cottingham sum rule

R. Mertig and W.L. van Neerven

Lorentz Institute for Theoretical Physics, University of Leiden, POB 9506, 2300RA Leiden, The Netherlands

Z. Phys. C 60 (1993) 489

There are two mistakes in our paper. One is present in the delta-function of $g_2(x, Q^2, m^2)$ in (15). The '-1' should be replaced by '0' so that the integral in (16) vanishes. The sum of (14) and (15) is now in agreement with the sum of (18) and (19) in G. Altarelli et al., Phys. Lett. B 334 (1994) 187. The second mistake is present in the delta-function of $g_2^{(1)}(x, Q^2, \zeta)$ (31). Here the '+1' should be replaced by '0'. Furthermore there is a misprint in (30). The argument of the first logarithm should be $Q^2(1-x)/(x\mu^2)$ instead of Q^2/μ^2 . The consequence is that the Burkhardt-Cottingham sum rule is valid for the massive quark case but it is violated for n-dimensional

regularization where the quark is taken to be massless. The origin of the violation can be attributed to the outer rainbow graph Fig. 2g which in the massive quark case does not contribute to $g_2^{(1)}$ because n can be put to be equal to four. Notice that (29)–(31) are obtained by first anticommuting γ_5 in (11a), (11b) with the other γ -matrices until it stands next to either γ_μ or γ_ν . This has to be done before the traces are carried out. If we do not move γ_5 and leave it in the way it is presented in (11a), (11b) we are not able to reproduce the results of J. Kodaira et al. in [18]. We would like to thank Dr. B. Lampe for discussions concerning the mistake made in (15).

Zeitschrift für Physik C – Particles and Fields is delivered to some institutions in the former Soviet Union through a program initiated and administered by the European Physical Society and supported by the publisher. This program is funded by INTAS, the international association for the promotion of cooperation with scientists from the independent States of the former Soviet Union. Members of INTAS are the European Union, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, United Kingdom and Switzerland. (INTAS, rue du Luxembourg 14A, 1040 Bruxelles, Belgique).