

XVth Quark Confinement and the Hadron Spectrum



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The parity-odd structure function of the nucleon from the Compton amplitude in lattice QCD

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The dominant contribution to the theoretical uncertainty in the extracted weak parameters of the Standard Model comes from the hadronic uncertainties in the electroweak box diagrams, i.e. $\gamma - W^\pm/Z$ exchange diagrams. A dispersive analysis relates the box diagrams to the parity-odd structure function, F_3 , for which the experimental data either do not exist or belong to a separate isospin channel. Therefore a first-principles calculation of F_3 is highly desirable.

In this contribution, I report on the CSSM/QCDSF/UKQCD Collaboration's progress in calculating the moments of the $F_3^{\gamma Z}$ structure function from the forward Compton amplitude at the SU(3) symmetric point. We focus on the first moment of $F_3^{\gamma Z}$ for a range of Q^2 values. We discuss the implications of our results for the electroweak box diagrams along with the possibility of a determination of the strong coupling constant via the Gross-Llewellyn Smith sum rule.

Primary author: Dr CAN, K. Utku (The University of Adelaide)

Co-authors: HANNAFORD GUNN, Alec (The University of Adelaide); SCHIERHOLZ, Gerrit (DESY); Dr ZANOTTI, James (The University of Adelaide); CRAWFORD, Joshua; RAKOW, Paul (University of Liverpool); HORSLEY, Roger (University of Edinburgh); YOUNG, Ross; Mr SCHAR, Thomas

Presenter: Dr CAN, K. Utku (The University of Adelaide)

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