Comments on Exclusive Electroproduction of Transversely Polarized Vector Mesons ◇

L. Mankiewicz and G. Piller

We discuss the electroproduction of light vector mesons from transversely polarized photons. Here QCD factorization cannot be applied as shown explicitly in a leading order calculation of corresponding Feynman diagrams. It is emphasized that present infrared singular contributions cannot be regularized throug phenomenological meson distribution amplitudes with suppressed endpoint configurations. We point out that infrared divergencies arise also from integrals over skewed nucleon parton distributions.

In a phenomenological analysis of transverse vector meson production model dependent regularizations have to be applied. If this procedure preserves the analytic structure suggested by a leading order calculation of Feynman diagrams, one obtains contributions from nucleon parton distributions and their derivatives. In particular polarized gluons enter only through their derivative.

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Coherence Phenomena in Nuclear Deep-inelastic Scattering

G. Piller

New insight into the nature of nuclear effects in deep-inelastic lepton scattering is obtained from a discussion of nuclear parton distributions in coordinate-space rather than in momentum-space. The largest effect is a strong depletion of parton distributions at large distances (shadowing), starting at distances which correspond to the average nucleon-nucleon separation. We emphasize the close relation between shadowing in deep-inelastic lepton-nucleus scattering and diffractive photo- and leptoproduction of hadrons from free nucleons. We show that the magnitude of nuclear shadowing at small Bjorken-x, as measured at CERN and FNAL, is directly related to HERA data on the amount of diffraction in the scattering from free nucleons.

Constituent Quarks and g_1 ◇

S. D. Bass

We review the theory and present status of the proton spin problem with emphasis on the transition between current quarks and constituent quarks in QCD.

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Conformal String Operators and Evolution of Skewed Parton Distributions ◇

N. Kivel and L. Mankiewicz

We have investigated skewed parton distributions in coordinate space. We found that their evolution can be described in a simple manner in terms of non-local, conformal operators introduced by Balitsky and Braun. The resulting formula is given by a Neumann series expansion. Its structure resembles, for all values of the asymmetry parameter, the well-known solution of the ERBL equation in the momentum space. Performing Fourier transformation we have reproduced known results for evolution of momentum-space distributions.

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