Renormalon Model Predictions for Power-Corrections to Flavour Singlet Deep Inelastic Structure Functions ◇

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We analyse power corrections to flavour singlet deep inelastic scattering structure functions in the framework of the infrared renormalon model. Our calculations, together with previous results for the non-singlet contribution, allow to model the x dependence of higher-twist corrections to F_2, F_L and g_1 in the whole x domain.

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Coherence Effects in Deuteron Spin Structure Functions ◇

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We investigate coherence effects in the deuteron spin structure functions $g_1 1d$ and b_1. In the kinematic domain of current fixed target experiments we observe that shadowing effects in g_1^d are approximately twice as large as for the unpolarized structure function F_2^d. Furthermore, we find that b_1 is large at $x < 0.1$ and receives dominant contributions from coherent double scattering.

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Baryon Masses in Large N_c Chiral Perturbation Theory ◇

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We analyse the baryon mass spectrum in a framework which combines the $1/N_c$ expansion with chiral perturbation theory. Meson loop contributions involving the full SU(3) octet of pseudoscalar Goldstone bosons are evaluated, and the influence of explicit chiral and flavor symmetry breaking by non-zero and unequal quark masses is investigated. We also discuss sigma terms and the strangeness contribution to the nucleon mass.

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Evidence for Quantum Chaos in the Plasma Phase of QCD

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We investigate the eigenvalue spectrum of the staggered Dirac matrix in $SU(3)$ gauge theory and in full QCD on a $6^3 \times 4$ lattice. As a measure of the fluctuation properties of the eigenvalues, we study the nearest-neighbor spacing distribution $P(s)$ for various values of β both in the confinement and in the deconfinement phase. In both phases except far into the deconfinement region, the lattice data agree with the Wigner surmise of random-matrix theory which is indicative of quantum chaos. We do not find signs of a transition to Poisson regularity at the deconfinement phase transition.