Spin Structure in Non-Forward Partons ◇

S. D. Bass

Renormalisation induces anomalous contributions in light-cone correlation functions. We discuss the role of the axial anomaly and gluon topology in non-forward parton distributions noting that non-forward matrix elements of the gluonic Chern-Simons current K_μ are not gauge-invariant even in perturbation theory. The axial anomaly means that one has to be careful how to interpret information from hard exclusive reactions about the orbital angular-momentum carried by the proton's internal constituents.

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Study of Relativistic Bound States in a Scalar Model Using Diagonalization/Monte Carlo Methods ◇

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We use a recently proposed diagonalization/Monte Carlo computational scheme to study relativistic two-body and three-body bound states in $(\phi^6 - \phi^4)_{1+1}$ theory. We find that the approach is well-suited for calculating bound state energies and wavefunctions.

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$U(3)$ Chiral Perturbation Theory with Infrared Regularization ◇

B. Borasoy and S. Wetzel

We include the η' in chiral perturbation theory without employing $1/N_c$ counting rules. The method is illustrated by calculating the masses and decay constants of the Goldstone boson octet (π, K, η) and the singlet η' up to one-loop order. The effective Lagrangian describing the interactions of the η' with the Goldstone boson octet is presented up to fourth chiral order and the loop integrals are evaluated using infrared regularization, which preserves Lorentz and chiral symmetry.

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Non-Critical Properties of the ϕ^4-Theory from the Thermal Renormalization Group ◇

R. A. Schneider

The thermal mass and the coupling in $\lambda\phi^4$ theory with unbroken and spontaneously broken $-Z_2$-symmetry are calculated at finite temperature within the non-perturbative thermal renormalization group (TRG). The results are compared with those obtained using perturbation theory and resummation methods. The effect of quantum corrections on the TRG solutions is discussed. It is found that the thermal coupling depends strongly on the renormalization scale whereas the mass itself does not.

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