QCD Spectral Sum Rules and Spontaneously Broken Chiral Symmetry ◇

E. Marco and W. Weise

Spectral sum rules have frequently been used to connect observable information through dispersion relations with the operator product expansion in QCD. We use finite energy sum rules for vector mesons and propose to identify the continuum threshold with chiral gap, $\Delta = 4\pi f_\pi \cong 1.2\,GeV$, thereby making the scale for spontaneous chiral symmetry breaking explicit in the lowest moments of the spectral distributions.

published in: Phys. Lett. B 482 (2000) 87

◇ *Work supported in part by BMBF project 06 TM 980*

QCD Spectral Sum Rules, Vector Mesons and Dilepton Production ◇

E. Marco, R. Schneider, and W. Weise

We summarize recent developments connecting QCD spectral sum rules with the scale of spontaneous chiral symmetry breaking. We also discuss vector mesons in hot matter and some aspects of thermal dilepton radiation from an expanding fireball.

published in: Proc. Int. Workshop on Hadrons in Dense Matter, Hirschegg, January 2000

◇ *Supported in part by BMBF project 06 TM 980 and GSI project TM WEIT*

Nuclear Shadowing and the Optics of Hadronic Fluctuations ◇

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A coordinate space description of shadowing in deep-inelastic lepton-nucleus scattering is presented. The picture in the laboratory frame is that of quark-gluon fluctuations of the high-energy virtual photon, propagating coherently over large light-cone distances in the nuclear medium. We discuss the detailed dependence of the coherence effects on the invariant mass of the fluctuation. We comment on the issue of possible saturation in the shadowing effects at very small Bjorken-x.

to be published in Nucl. Phys. A

◇ *Supported by BMBF project 06 TM 980*

Threshold η and η' Electroproduction off Nucleons ◇

B. Borasoy

The role of Born terms and resonance exchange for electroproduction of η and η' mesons on the proton and the neutron is investigated within the framework of $U(3)$ chiral perturbation theory. Low-lying resonances such as the vector mesons and $J^P = 1/2^+$, $1/2^-$ baryon resonances are included explicitly and their contributions together with the Born terms are calculated. Results for the separated differential cross sections are presented.

submitted to Phys. Rev. D

◇ *Supported in part by DFG project BO.1481/2-1*