HK 20: Theorie

Zeit: Dienstag 17:00–18:45 Raum: C

HK 20.1 Di 17:00 C

The phase structure of a chiral Polyakov quark meson model — Jan Martin Pawlowski[1], •Bernd-Jochen Schaefer[2], and Jochen Wambach[3,4] — [1]Institut für Theoretische Physik, Universität Heidelberg, D-69120 Heidelberg, Germany — [2]Institut für Physik, Karl-Franzens-Universität, A-8010 Graz, Austria — [3]Institut für Kernphysik, TU Darmstadt, D-64289 Darmstadt — [4]Theory Division, GSI mbH, D-64291 Darmstadt, Germany

Dieser Vortrag musste leider abgesagt werden.

HK 20.2 Di 17:15 C

Quark mass dependence of 1-loop and HTL self-energies — •Daniel Seipt[1], Marcus Bluhm[2], Robert Schulze[1], and Burkhard Kämpfer[1,2] — [1]Institut für Theoretische Physik, TU Dresden, 01062 Dresden, Germany — [2]Forschungszentrum Dresden-Rossendorf, PF 510119, 01314 Dresden, Germany

We present a systematic study of the quark mass dependence of 1-loop and HTL self-energies in hot QCD. These self-energies enter our quasiparticle model, which allows to parametrize and extend lattice QCD results for the equation of state. The primary goal is a handle of the chiral extrapolation of lattica data, provided often at finite quark mass parameters. Another interest is the precise description of the thermal history of the universe over a large temperature interval, say from electroweak symmetry breaking down to chiral restoration, where the strongly interacting matter dominates over contributions from the electroweak sector.

HK 20.3 Di 17:30 C

Test of "Bottom-Up" Thermalization Scenario within a Parton Cascade Model with 2<->2 and 2<->3 Processes — •Andrej El, Zhe Xu, and Carsten Greiner — Institut für theoretische physik, Frankfurt am Main

We investigate thermalization of QGP within a parton cascade model with both elastic and inelastic processes included. We compare the results with the predictions of the "Bottom-Up" Scenario.

HK 20.4 Di 17:45 C

Goldstone-Bosonen in der Color-Flavor-Locked-Phase — •Verena Werth[1], Michael Buballa[1] und Micaela Oertel[2] — [1]Institut für Kernphysik, TU Darmstadt — [2]Observatoire de Paris-Meudon

Man geht heute davon aus, dass stark wechselwirkende Materie bei sehr hoher Dichte und niedriger Temperatur ein Farbsupraleiter in der "Color-Flavor-Locked-Phase" ist, in der Up-, Down- und Strange-Quarks in Diquarkkondensaten gepaart sind. Dadurch wird die chirale Symmetrie der QCD spontan gebrochen, so dass es – ähnlich wie im Vakuum – leichte pseudoskalare Goldstone-Bosonen gibt, welche sich bei extrem hohen Dichten im Rahmen von effektiven Feldtheorien (EFT) beschreiben lassen.

Im Vortrag diskutieren wir die explizite Konstruktion dieser Goldstone-Anregungen in einem NJL-artigen Modell durch die Berechnung von Diquark-Polarisationsloops. Bei schwachen Kopplungen stimmen die Ergebnisse sowohl für die Massen als auch für die Zerfallskonstanten dieser Anregungen hervorragend mit den EFT-Vorhersagen überein. Bei starken Kopplungen finden wir dagegen quantitative Abweichungen, die sich jedoch weitgehend analytisch verstehen lassen. Wir bestätigen ferner das Auftreten von Kaon-artigen Bosekondensaten bei hinreichend großer Strange-Quarkmasse.

HK 20.5 Di 18:00 C

Omega mesons in medium — •Fabian Eichstädt, Stefan Leupold, and Ulrich Mosel — Institut für Theoretische Physik, Universität Giessen, Germany

Recent experimental observation indicates a downward mass shift of the ω meson when put into a nuclear medium. Therefore it is worthwhile to take a look at theoretical approaches that can describe this mass shift. One such hadronic model was introduced by Klingl et al. (Nucl.Phys.A650:299-312,1999) The model will be shortly introduced in this talk and some of our results will be presented and compared with the previous results presented by Klingl et al. It turns out that the main approximation used by Klingl et al has no justification. A corrected calculation within this model yields unreasonable results.

Work supported by DFG.

HK 20.6 Di 18:15 C

Nucleon and ω-Meson at Finite Density: The Role of Four-Quark Condensates in QCD Sum Rules — •Ronny Thomas[1], Thomas Hilger[2], Sven Zschocke[3], and Burkhard Kämpfer[1,2] — [1]Forschungszentrum Dresden-Rossendorf, PF 510119, 01314 Dresden, Germany — [2]Institut für Theoretische Physik, TU Dresden, 01062 Dresden, Germany — [3]TU Dresden, Lohrmann-Observatorium, 01062 Dresden, Germany

In-medium modifications of hadrons can be related to the density dependence of QCD condensates via QCD sum rules. The impact of the renormalization invariant combination $m_q\langle\bar{q}q\rangle$ in QCD sum rules for light vector mesons is numerically small. Instead, four-quark condensates essentially drive the change of spectral properties of light vector mesons embedded in nuclear matter. We present a generic catalog of four-quark condensates and compare the structures appearing in baryon and meson sum rules in the light quark sector. The nucleon self-energies at finite density are revisited and evaluations in this framework are compared to advanced nuclear matter calculations. For the ω-meson, qualitative findings in photoproduction data from the CB-TAPS collaboration are analyzed, cf. [1]. This allows to constrain the density dependence of special combinations of four-quark condensates.

[1] R. Thomas, S. Zschocke and B. Kämpfer, *Phys. Rev. Lett.* **95**, 232301 (2005).

HK 20.7 Di 18:30 C

The phase diagram of the three-flavor quark-meson model — Bernd-Jochen Schaefer[1], •Mathias Wagner[2], and Jochen Wambach[2,3] — [1]Institut für Physik, Karl-Franzens-Universität, A-8010 Graz, Austria — [2]Institut für Kernphysik, TU Darmstadt, D-64289 Darmstadt,Germany — [3]Gesellschaft für Schwerionenforschung GSI, D-64291Darmstadt,Germany

In this talk we present first results of our calculation of the chiral phase diagram of three flavor quark-meson model. The dependence of the phase boundaries on the quark masses is discussed. The results for the in-medium masses of the mesons, the pressue, the quark-number density and chiral susceptibility are compared with other model and lattice calculations. These studies are the basis for a more sophisticated treatment within a functional renormalization group approach.