Gemeinsame Veranstaltung von
Humboldt-Universität zu Berlin, Institut für Physik
(Theorie der Elementarteilchen / Computerorientierte Theoretische Physik)
DESY, Zeuthen

SEMINAR
Feldtheorie auf dem Gitter und Phänomenologie der Elementarteilchen

Am Dienstag, dem **12 Dezember, um 15:30 Uhr s.t.** spricht

Dr. **Christian Fischer**

Technical University of Darmstadt

zum Thema

Infrared behaviour of Landau gauge QCD in the continuum and on compact manifolds

Abstract

We review recent results on the infrared properties of QCD from a nonperturbative functional integral approach and compare with results from lattice QCD

The infrared behaviour of one-particle irreducible Green's functions in $SU(N)$ Yang-Mills theory in Landau gauge is investigated employing a skeleton expansion of Dyson-Schwinger equations. We present a unique infrared solution of the whole tower of equations. The running coupling as extracted from the primitively divergent vertices of the theory possesses an infrared fixed point.

For the quark sector of quenched QCD we demonstrate analytically that a linear rising potential between heavy quarks is generated by infrared singularities in the dressed quark-gluon vertex. These singularities are only present when chiral symmetry is broken. We have thus uncovered a new mechanism that links chiral symmetry breaking with confinement.

We also present numerical solutions for the ghost, gluon and quark propagators. We compare these solutions to corresponding results on the lattice with a particular emphasis on volume effects. To this end we employ a formulation of Dyson-Schwinger equations on a torus. The existence of the correct infinite volume limit is demonstrated and volume effects in the ghost, gluon and quark propagators are discussed.

Ort: Humboldt-Universität zu Berlin, Institut für Physik
Newtonstraße 15, 12489 Berlin-Adlershof, **Raum 1'202**
(Lageplan: `http://linde.physik.hu-berlin.de/images/lageplan_neu.gif`)

Fahrverbindungen: S-Bahn-Station Adlershof

Web: `http://www-zeuthen.desy.de/~shindler/seminar/seminar.html`