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 **22. Januar, um 15:00 Uhr s.t.** spricht

Dr. **Federico Farchioni**

Universität Münster

zum Thema

Lattice simulation of QCD with one quark flavor

Abstract

QCD with one quark flavor ($N_f = 1$ QCD) radically differs from QCD with two or more flavors since a chiral symmetry is missing at the quantum level. In fact, one can argue that the single flavor variant of QCD is more related to the $\mathcal{N}=1$ SUSY Yang-Mills theory (SYM): the two theories become equivalent in a special (orientifold) large N_c limit. In this talk, I will present first results for the low-lying bound state spectrum of $N_f = 1$ QCD from a lattice simulation of the theory with dynamical quark. Results are interpreted in view of the expected relics of SUSY in the mass spectrum. The chiral symmetry of the single flavor theory can be artificially enhanced by adding extra valence quarks. Operators in the valence pion sector can be in this way built and a definition of the quark mass, otherwise problematic in absence of chiral symmetry, can be given. The dependence of the masses and decay constants of these "artificial" pions upon the quark mass is analyzed by means of partially quenched chiral perturbation theory.

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