T 19: Gittereichtheorie

Zeit: Montag 11:00–12:00 Raum: P108

T 19.1 Mo 11:00 P108

Finite temperature supersymmetry on the lattice — •Stefano Piemonte — Institut für Theoretische Physik - Westfälische Wilhelms-Universität Münster

The behaviour of supersymmetric theories at finite temperatures differs from that of other theories in certain aspects. Due to the different thermal statistics of bosons and fermions, supersymmetry is explicitly broken for any non-zero value of the temperature. We study the N=1 supersymmetric Yang-Mills theory on the lattice at finite temperatures. This model is the simplest supersymmetric extension of the pure gauge sector of QCD, describing the interactions between gluons and their fermionic superpartners, the gluinos. At zero temperature the theory confines like QCD, and chiral symmetry is spontaneously broken. At high temperatures, deconfinement and chiral symmetry restoration are expected to take place, but it is not known whether these two phase transitions coincide or not. First results on this topic, obtained in numerical simulations, will be presented and discussed.

T 19.2 Mo 11:15 P108

Phase diagram of Wilson fermions with iso-spin chemical potential and of twisted mass fermions — •Mario Kieburg[1], Kim Splittorff[2], Jacobus Verbaarschot[3], and Savvas Zafeiropoulos[4] — [1]Fakultät für Physik, Universität Bielefeld, Bielefeld, Germany — [2]The Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark — [3]Department of Physics and Astronomy, State University of New York at Stony Brook, USA — [4]Laboratoire de Physique Corpusculaire, Université Blaise Pascal, Aubière Cedex, France

Wilson fermions exhibit new phase structures like the Aoki phase which prevent in certain regimes of the phase diagram an extrapolation to continuum QCD. Therefore one can expect that these phases have also a crucial impact at finite chemical potential. Especially the low lying eigenvalue spectrum of the Dirac operator is affected by those phase transitions. I am going to present new results on the phase diagram of Wilson fermions with real as well as imaginary iso-spin chemical potential. In particular I am going to show how the Aoki phase influences the analytical continuity of an iso-spin chemical potential in the epsilon-regime of a two-flavor theory. The spectrum of the Wilson Dirac operator at finite iso-spin chemical potential of a two flavor theory is unitarily equivalent to the one of twisted mass fermions. Thus, the results I am going to present apply to those fermions, too.

T 19.3 Mo 11:30 P108

Determination of $\Lambda_{\overline{MS}}$ from the static potential for $n_f = 2$ quark flavours in momentum space — •Antje Peters[1], Felix Karbstein[2], and Marc Wagner[1] — [1]Institut für Theoretische Physik, Goethe Universität Frankfurt am Main, Germany — [2]Theoretisch-Physikalisches Institut, Friedrich-Schiller-Universität Jena

We discuss the determination of $\Lambda_{\overline{MS}}$ for QCD with $n_f = 2$ dynamical quark flavors from the static quark-antiquark potential combining lattice QCD and perturbation theory. In contrast to existing work the matching of lattice and perturbative results is done in momentum space.

T 19.4 Mo 11:45 P108

Determination of c_{sw} in $N_f = 3 + 1$ Lattice QCD with Wilson fermions — Patrick Fritzsch[1], Rainer Sommer[2], •Felix Stollenwerk[1], and Ulli Wolff[1] — [1]HU Berlin — [2]DESY Zeuthen

We report on the determination of the improvement coefficient c_{sw} for O(a) improved Wilson fermions in combination with the tree-level improved gauge action in $N_f = 3 + 1$ Lattice QCD with massive sea quarks.