

T 24: Gittereichtheorie

Convenor: Karl Jansen

Zeit: Montag 17:00–18:45

Raum: A021

T 24.1 Mo 17:00 A021

The spectrum of the QCD flux tube in 3d SU(2) lattice gauge theory — ●BASTIAN BRANDT¹ and PUSHAN MAJUMDAR² — ¹Institut fuer Kernphysik, Johannes Gutenberg-Universitaet, Johann-Joachim Becher-Weg 45, 55099 Mainz, Germany — ²Indian Association for the Cultivation of Science, Jadavpur, Kolkata-700032, India

Evidence from the lattice suggests that formation of a flux tube between a quark and an antiquark in the QCD vacuum leads to quark confinement. For large separations between the quarks, it is conjectured that the flux tube has a behavior similar to an oscillating bosonic string. Comparison of lattice data for the groundstate $q\bar{q}$ potential to the predictions of effective string theories support this picture. We look at the excited states of the flux tube in 3d SU(2) gauge theory on the lattice and compare our results to the predictions for open bosonic string spectra, in order to distinguish between different bosonic string models.

T 24.2 Mo 17:15 A021

Lattice simulation of a center symmetric three-dimensional effective theory for SU(2) Yang-Mills — ●DOMINIK SMITH¹, STEFAN SCHRAMM¹, and ADRIAN DUMITRU² — ¹Universität Frankfurt, ITP, Max-von-Laue Str.1, 60438 Frankfurt — ²Baruch College, Dept. of Natural Sciences, 17 Lexington Ave., New York, NY 10010, USA

We perform simulations of an effective theory of SU(2) Wilson lines in three dimensions. Our action includes a kinetic term, the one-loop perturbative potential for the Wilson line, a non-perturbative "fuzzy-bag" contribution and spatial gauge fields. We determine the phase diagram of the theory and confirm that, at moderately weak coupling, the non-perturbative term leads to eigenvalue repulsion in a finite region above the deconfining phase transition.

T 24.3 Mo 17:30 A021

Filtering methods in SU(3) lattice gauge theory — ●FLORIAN GRUBER, STEFAN SOLBRIG, FALK BRUCKMANN, and ANDREAS SCHÄFER — Institut für Theoretische Physik, Universität Regensburg, D-93040 Regensburg, Germany

We systematically compare filtering methods used to extract topological excitations from lattice gauge configurations. We show that there is a strong correlation of the topological charge densities obtained by APE and Stout smearing. Furthermore, a first quantitative analysis of quenched and dynamical configurations reveals a crucial difference of their topological structure. The topological charge density is much more fragmented, when dynamical quarks are present. This implies that smearing has to be handled with great care, not to destroy these characteristic structures.

T 24.4 Mo 17:45 A021

SU(2) gauge theory in 5 dimensions — ●MAGDALENA LUZ and FRANCESCO KNECHTLI — Bergische Universitaet Wuppertal, Deutschland

Extra-dimensional gauge theories with orbifold boundary conditions are a possible extension of the standard model if the extra dimensional component of the gauge field is identified with the Higgs.

We study an SU(2) gauge theory in 5 dimensions on an anisotropic lattice. We present results concerning spontaneous symmetry breaking and compactification on both the torus and the orbifold.

T 24.5 Mo 18:00 A021

Hadron spectrum from lattice QCD with light quark masses — ●CARSTEN URBACH — Humboldt-Universitaet zu Berlin

We present recent results for the hadron spectrum obtained from lattice QCD simulations by the European Twisted Mass collaboration (ETMC). ETMC employs the so called twisted mass formulation of lattice QCD, which allows for large scale simulations with $n_f = 2$ or $n_f = 2 + 1 + 1$ flavours of light quarks.

We shall present results for meson masses and decay constants as well as for masses of the baryon octet and decuplet. We shall also discuss the extrapolation of these quantities to the chiral, continuum and thermodynamic limit.

T 24.6 Mo 18:15 A021

Determining the charm-quark mass from current-current correlators in twisted mass lattice QCD — ●MARCUS PETSCHLIES — Institut fuer Physik, Humboldt-Universitaet zu Berlin

We use the twisted mass lattice QCD formulation to estimate temporal moments of charm-quark current-current correlators, taking advantage of automatic $O(a)$ -improvement. Using these moments in combination with up to four loop continuum perturbation theory we aim for a calculation of both the strong coupling constant and the charm quark mass with high precision.

T 24.7 Mo 18:30 A021

Cut-off effects of Wilson type fermions on the QCD equation of state to $O(g^2)$ — OWE PHILIPSEN and ●LARS ZEIDLEWICZ — Institut für Theoretische Physik, Universität Münster

We compute the $O(g^2)$ contribution to the thermodynamic pressure for Wilson fermions in the standard, the twisted mass and clover improved formulation in lattice perturbation theory. Clover and maximally twisted fermions offer $O(a)$ -improvement and thus are qualitatively comparable to standard staggered fermions. We compare the continuum approaches of these discretisations for the case of massive quarks along a line of constant physics and discuss their scaling behaviour.