QCD with one quark flavor: II. Analysis and chiral perturbation theory

Presenter: Tobias Sudmann — University of Muenster
F. Farchioni, I. Montvay, G. Muenster, E.E. Scholz, T. Sudmann, J. Wuilloud

One-flavor QCD – a gauge theory with SU(3) colour gauge group and a fermion in the fundamental representation – is studied by Monte Carlo simulations. Properties of the theory are analyzed by making use of the ideas of partially quenched chiral perturbation theory (PQChPT). Due to the U(1)\textsubscript{A} anomaly, the single-flavor QCD theory does not have a continuous chiral symmetry. However the symmetry can be artificially enhanced by adding extra valence quarks, which can be interpreted as \textit{u} and \textit{d} quarks. Operators in the valence pion sector can be built. Masses and decay constants are analyzed by using PQChPT formulae at next-to-leading order.