Can we study Quark Matter in the Quenched Approximation?

Presenter: Pietro Giudice — Universita’ di Torino, INFN Torino

Pietro Giudice, Simon Hands

We study a quenched SU(2) lattice gauge theory in which, in an attempt to distinguish between timelike and spacelike gauge fields, the gauge ensemble $U_\mu$ is generated from a 3 dimensional gauge-Higgs model, the timelike link variables being 'reconstructed' from the Higgs fields. The resulting ensemble is used to study quenched quark propagation with non-zero chemical potential $\mu$; in particular, the quark density, chiral and superfluid condensates, meson, baryon and gauge-fixed quark propagators are all studied as functions of $\mu$. While it proves possible to alter the strength of the inter-quark interaction by changing the parameters of the dimensionally reduced model, there is no evidence for any region of parameter space where quarks exhibit deconfined behaviour or thermodynamic observables scale as if there were a Fermi surface.