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Translating topological benefits in very cold master-field simulations

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Master-field simulations offer an approach to lattice QCD in which calculations are performed on a small number of large-volume gauge-field configurations. This is advantageous for simulations in which the global topological charge is frozen due to a very fine lattice spacing, as the effect of this on observables is suppressed by the spacetime volume. Here we make use of the recently developed Stabilised Wilson Fermions to investigate a variation of the master-field approach in which only the temporal direction (T) is taken larger than in traditional calculations. As compared to a hyper-cubic master-field geometry, this has the advantage that finite-L effects can be useful, e.g. for multi-hadron observables, while compared to open boundary conditions time-translation invariance is not lost.

In this proof-of-concept contribution, we study the idea of using very cold, i.e. long-T, lattices to topologically 'defrost' observables at fine lattice spacing. We identify the scalar-scalar meson two-point correlation function as useful probe and present first results from Nf=3 ensembles with time extents up to T=2304 and a lattice spacing of a=0.055fm.

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