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Critical behaviour and phase structure of 3d Scalar+Gauge Field Theories in the adjoint representation

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In holographic cosmology, the dual theory may be described by a family of super-renormalisable QFTs in 3 dimensions. In order to obtain cosmological observables, correlators in the massless regime of this QFT are obtained via lattice field theory. Previous work has focused on scalar ϕ^4 matrix theories in the adjoint representation of SU(N). In this work we present a preliminary exploratory result in the critical behaviour and phase structure of the theory with an SU(N) scalar field coupled to gauge fields by utilising the Heatbath-Overrelaxation (HBOR) algorithm in lattice field theory.

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