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Density of states techniques for lattice field theory with topological terms

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Topological terms contribute an imaginary part to the action such that for a numerical simulation of such systems the corresponding complex action problem has to be overcome. We address this task with newly developed density of states techniques combined with open boundary conditions that lift the integer quantization of the topological charge. We present results for U(1) and SU(2) lattice gauge theory in 2 and 4 dimensions and demonstrate that the new approach allows for simulations at finite topological angle.

Primary authors: GATTRINGER, Christof (University of Graz); ORASCH, Oliver (University of Graz)

Presenter: GATTRINGER, Christof (University of Graz)

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