The Witten Laplacian and Infrared Bounds

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Abstract

In a seminal paper [Commun. Math. Phys. 1976], Frøhlich, Simon, and Spencer derived infrared bounds for classical statistical mechanical lattice systems with a continuous symmetry that imply the existence of a phase transition at sufficiently low temperature in $d>3$ spatial dimensions. We also derive such infrared bounds, but without assuming translation invariance and without using reflection positivity. Instead, we use the Witten Laplacian and the Helffer-Sjöstrand Formula. This is joint work with Fiona Gottschalk.