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Energy Spectroscopy of Quantum Critical Systems: Theory & Possible Experiments

physikalisches

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 16:00 Uhr
 Ort: H34

Quantum field theories play an important role in many condensed matter systems for their description at low energies and long length scales. In 1+1 dimensional critical systems the energy spectrum and the spectrum of scaling dimensions are intimately related in the presence of conformal symmetry. In higher space-time dimensions this relation is more subtle and not well explored numerically.

In this colloquium we motivate and review our recent effort to characterize 2+1 dimensional quantum field theories using computational techniques targetting the energy spectrum on a spatial torus. We discuss several examples ranging from the $O(N)$ Wilson Fisher theories and Gross-Neveu-Yukawa theories to deconfinement-confinement transitions in the context of topological ordered systems. We close by discussing the prospects for experimental investigations of the energy spectrum on mesoscopic systems.

