

Spectral properties of critical 1+1 Abelian Higgs model and beyond 45'

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*The Abelian-Higgs model, the theory of bosonic matter interacting with photons, has a single phase in the continuum for one dimensional time-dependent (1+1) model. Unexpectedly, we have found recently [Phys. Rev. Lett. **128**, 090601 (2022)] phase transitions when the system is discretized on the lattice. We identify a line of first order phase transitions separating the Higgs region from the confined one. This line terminates in a quantum critical point above which the two regions are connected by a smooth crossover. We analyze the critical point and find compelling evidence for its description as the product of two noninteracting systems: a massless free fermion and a massless free boson resulting in a central charge $c=3/2$. However, we find also some surprising results that cannot be explained by our simple picture, suggesting this newly discovered critical point is an unusual one [Phys. Rev. **B109**, 045103 (2024)].*