Titel: Analytic approaches to tensor networks for critical systems and field theories

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Abstract:
I will discuss analytic approaches to construct tensor network representations of quantum field theories, more specifically critical systems and conformal field theories in 1+1 dimensions. A key insight is that we should understand how well the tensor network can reproduce the correlation functions of the quantum field theory. Based on this measure of closeness, I will present rigorous results allowing for explicit error bounds which show that the multiscale renormalization Ansatz (MERA) does approximate conformal field theories. In particular, I will discuss the case of free fermions, both on the lattice and in the continuum, as well as Wess-Zumino-Witten models. The talk is based on joint work with Jutho Haegeman, Glen Evenbly, Jordan Cotler (lattice) and Brian Swingle and Michael Walter (lattice & continuum).