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**Universal Behavior of Entanglement in 2D Quantum Critical Dimer Models** BENJAMIN HSU, EDUARDO FRADKIN, UIUC — We examine the scaling behavior of the entanglement entropy for the 2D quantum dimer model (QDM) at criticality and derive the universal finite sub-leading correction $\gamma_{QCP}$. We compute the value of $\gamma_{QCP}$ without approximation working directly with the wave function of a generalized 2D QDM at the Rokhsar-Kivelson QCP in the continuum limit. Using the replica approach, we construct the conformal boundary state corresponding to the cyclic identification of $n$-copies along the boundary of the observed region. We find that the universal finite term is $\gamma_{QCP} = \ln R - 1/2$ where $R$ is the compactification radius of the bose field theory quantum Lifshitz model, the effective field theory of the 2D QDM at quantum criticality. We also demonstrated that the entanglement spectrum of the critical wave function on a large but finite region is described by the characters of the underlying conformal field theory. It is shown that this is formally related to the problems of quantum Brownian motion on $n$-dimensional lattices or equivalently a system of strings interacting with a brane containing a background electromagnetic field and can be written as an expectation value of a vertex operator.

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