Criticality in one-dimensional supersymmetric lattice fermions MATTHIAS TROYER, Theoretische Physik, ETH Zurich, Switzerland, BELA BAUER, Station Q, Microsoft Research, Santa Barbara and Theoretische Physik, ETH Zurich, Switzerland, LIZA HUIJSE, EREZ BERG, Department of Physics, Harvard University, Cambridge, KARELJAN SCHOUTENS, Institute for Theoretical Physics, University of Amsterdam — A supersymmetric model for lattice fermions has been seen to host a plethora of interesting phenomena. On one-dimensional and quasi-one-dimensional lattices, the model naturally becomes critical and it has been conjectured that it is described by superconformal field theory. While this relation has been confirmed for the chain, establishing this link and exploring the phases adjacent to the critical point for the case of the square ladder has turned out to be a challenging problem for numerical simulations. In our work, we collect evidence in support of the conjecture and obtain insights into the adjacent phases using a variety of numerical techniques, including the density-matrix renormalization group and the multi-scale entanglement renormalization ansatz.

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