Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Density matrix of disjoint regions as a way of determining dominant correlations in interacting systems HITESH CHANGLANI, OLABODE SULE, SHINSEI RYU, University of Illinois at Urbana-Champaign — In the context of strongly correlated systems, studying the ground state reduced density matrix (or derived quantities, such as the entanglement entropy and spectrum) of a local region has turned out to be useful for characterizing a wide variety of phases. However, to make definitive quantitative mappings of lattice simulations to field theories one needs to go beyond the density matrix of a single region. We use critical spin chains to demonstrate how information from the density matrix of disjoint regions (obtained from the density matrix renormalization group) [1,2] can be used to calculate the low-lying scaling dimensions (and operators) of the corresponding conformal field theory. In a related context, we will also discuss the use of density matrices that involve more than just the ground state, as a way of detecting order in the system [3]. [1] W. Muender, A. Weichselbaum, A. Holzner, J. von Delft, C. L. Henley, New. J. Phys., 12, 075027 (2010) [2] H.J. Changlani, O. Sule, S. Ryu (in preparation) [3] C. L. Henley and H.J. Changlani, J. Stat. Mech. 2014(11), 11002 (2014)

Hitesh Changlani
University of Illinois at Urbana-Champaign

Date submitted: 14 Nov 2014 Electronic form version 1.4