Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Criticality in Translation-Invariant Parafermion Chains WEI LI, Physics Department, Arnold Sommerfeld Center for Theoretical Physics, Ludwig-Maximilians-Universitaet, 80333 Munich, Germany, SHUO YANG, HONG-HAO TU, Max-Planck-Institute for Quantum Optics, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany, MENG CHENG, Station Q, Microsoft Research, Santa Barbara, CA 93106, USA — Parafermionic zero modes have been recently proposed to emerge at certain topological defects in Abelian fractional quantum Hall systems. In this work, we investigate the phase diagram of a translationally invariant Z_3 parafermion chain, with nearest- and next-nearest-neighbor hopping terms. The model can be mapped to a Z_3 Potts model with nearest-neighbor couplings via a generalized Jordan-Wigner transformation. The phase diagram is obtained numerically via accurate density matrix renormalization group method, and six gapless phases with central charges being 4/5, 1 or 2 are found. By checking the energy derivatives, we observe continuous phase transitions between $c = 1$ and $c = 2$ phases, while the phase transition between $c = 4/5$ and $c = 1$ is conjectured to be of Kosterlitz-Thouless type.

Wei Li
Physics Department, Arnold Sommerfeld Center for Theoretical Physics,
Ludwig-Maximilians-Universitaet, 80333 Munich, Germany

Date submitted: 15 Nov 2013 Electronic form version 1.4