Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Line of Critical points protected by dynamical constraint Z. DAI, ADAM NAHUM, Massachusetts Inst of Tech-MIT — We studied the scaling structure of the 2+1D critical quantum loop gas models first proposed by Michael Freedman et al. These models describe a line of quantum critical points with no known field theory description but with connections to topological phase transitions. We found them to be a generic line of critical points under the no-reconnection constraint. This dynamical constraint is preserved under RG and leads to a new universality class. Through a correspondence between the ground state of the quantum model and the 2D classical loop gas, we are able to calculate the equal-time correlation function and identify the scaling dimension for every local operator. This correspondence further extends to the dynamics of both sides, thus allow the determination of the dynamical exponent through simulations on a classical relaxation process. Numerical results on honeycomb lattice with 500*500 plaquettes yielded a dynamical exponent of 3 along the line.

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Date submitted: 13 Nov 2016 Electronic form version 1.4