Abstract Submitted for the MAR15 Meeting of The American Physical Society

Topological Phases of Interacting Bosons on the Kagome Lattice KRISHANU ROYCHOWDHURY, SUBHRO BHATTACHARJEE, FRANK POLL-MANN, MPIPKS, Dresden — We consider an extended Hubbard model of hard core bosons including nearest-neighbour hopping and long range repulsive interactions on a kagome lattice. The system is an insulator at commensurate fillings of 1/6, 1/3and 1/2 and can be mapped to different dimer models on the triangular lattice (depending on the filling). We focus on the filling of 1/3, which transforms to a fully packed loop (FPL) model, and derive the full phase diagram in the low-energy subspace. Similar to the quantum dimer model and easy-axis kagome antiferromagnetic model studied before, we find an extended region of a gapped Z_2 liquid with vison excitations. The gauge fluctuations, responsible for the vison modes, are dictated by the action of an *even* Ising gauge theory. In the ordered phase, where the vison gap closes, we observe a 3-fold rotationally symmetric loop ordering and present the critical theory for the amplitude fluctuations of the condensed modes. We also speculate the phase diagram for the fermionic counterpart of the model at all the above mentioned fractional fillings.

> Krishanu Roychowdhury MPIPKS, Dresden

Date submitted: 20 Oct 2014

Electronic form version 1.4