Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Interaction-driven fractional quantum Hall state of hard-core bosons on kagome lattice at one-third filling[1] D. N. SHENG, California State University, Northridge, S. S. GONG, National High Magnetic Field Lab, W. ZHU, California State University, Northridge — There has been a growing interest in realizing topologically nontrivial states of matter in band insulators, where a quantum Hall effect can appear as an intrinsic property of the band structure. While the on-going progress is under way with a number of directions, the possibility of realizing novel interaction-generated topological phases, without the requirement of a nontrivial invariant encoded in single-particle wavefunction or band structure, can significantly extend the class of topological materials and is thus of great importance. Here, we show an interaction-driven topological phase emerging in an extended Bose-Hubbard model on kagome lattice, where the non-interacting band structure is topological trivial with zero Berry curvature in the Brillouin zone. By means of an unbiased state-of-the-art density-matrix renormalization group technique, we identify that the groundstate in a broad parameter region is equivalent to a bosonic fractional quantum Hall Laughlin state, based on the characterization of unverisal properties including groundstate degeneracy, edge excitations and anyonic quasiparticle statistics. Our work paves a way of finding interaction induced topological phase at the phase boundary of conventionally ordered solid phases.

[1]This research is supported by the DOE grants No. DE-FG02-06ER46305, and the NSF grant No. DMR-1408560

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Date submitted: 05 Nov 2015 Electronic form version 1.4