Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Realizing topological states with polyatomic symmetric top molecules[1] MICHAEL WALL, JILA, KENJI MAEDA, LINCOLN CARR, Colorado School of Mines — We show how to use polyatomic symmetric top molecules, such as methyl fluoride, in an optical lattice to produce states with non-trivial topology via a self-consistent analog of the proximity effect in the internal state space of the molecule. The key ingredient is pairwise transitions between internal states of a molecule which are generated by the dipole-dipole interaction and made resonant by a combination of static and AC electric field dressing. These pairwise transitions endow the effective many-body Hamiltonian with a $U(1)\times Z_2$ symmetry leading to topologically nontrivial states. We will present results of matrix product state simulations demonstrating non-trivial topology, and also provide mappings of the many-body description to models of quantum spins with un-conserved magnetization as well as to systems with Majorana fermion excitations.

[1]Supported by AFOSR and NSF

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Date submitted: 14 Nov 2013 Electronic form version 1.4