Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Tomography of topological microwave resonator arrays for quantum simulation with light AMAN LACHAPELLE, CLAI OWENS, BRENDAN SAXBERG, RUICHAO MA, DAVID SCHUSTER, JONATHAN SIMON, Univ of Chicago — We have created topologically non-trivial states of light by engineering arrays of microwave resonators. Characterization of our lattices is paramount to realizing idealized many-body Hamiltonians, and we make use of a spectroscopic technique to perform full tomography of the Hamiltonian as well as to extract information about topological invariants of the system. By taking one and two site measurements we can fully extract the onsite and tunneling matrix elements of the Hamiltonian. The transmission between neighboring sites also reveals the phase of the tunnel coupling, thereby allow direct measurement of the flux in lattices with time-reversal breaking synthetic gauge fields. This measurement of the flux allows us to measure the projector onto the different bands in our system, which in turn allows us to calculate the Chern number of the various bands. We will discuss extending this technique to lattices with non-trivial real space curvature.

Aman LaChapelle
Univ of Chicago

Date submitted: 11 Nov 2016 Electronic form version 1.4