Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

A Superconducting Harper-Hofstadter Lattice for Microwave Photons[1] CLAI OWENS, AMAN LACHAPELLE, BRENDAN SAXBERG, RUICHAO MA, DAVID SCHUSTER, JONATHAN SIMON, University of Chicago
— We present the latest progress in developing a novel architecture for exploration of topological matter. We construct photonic lattices from tunnel-coupled, time-reversal-broken microwave cavities that are both low loss and compatible with Josephson junction-mediated particle-particle interactions, allowing us access to topological phenomena such as the fractional quantum Hall effect. We employ seamless 3D microwave cavities all machined from a single block of high purity superconductor, along with Yttrium-Iron-Garnet (YIG) spheres magnetically biased below the critical field so our meta-material is scalable and directly compatible with the circuit QED toolbox. After demonstrating the essential properties of a time-reversal broken topological insulator at room temperature without interactions, we now push towards coupling Josephson junction qubits to a cryo-compatible superconducting lattice.

[1]This work was primarily supported by the University of Chicago Materials Research Science and Engineering Center, which is funded by the National Science Foundation under Award No. DMR-1420709. This work was supported by ARO Grant No. W911NF-15-1-0397. D.

Clai Owens
University of Chicago

Date submitted: 26 Jan 2018 Electronic form version 1.4