

Abstract Submitted  
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**Single photon Chern insulator in superconducting microwave lattices**<sup>1</sup> CLAI OWENS, BRENDAN SAXBERG, RUICHAO MA, DAVID SCHUSTER, JONATHAN SIMON, University of Chicago — We present our latest progress towards developing a new architecture for quantum simulation of 2D materials with Hamiltonians that include both magnetic fields and particle interactions. We construct lattices for microwave photons from tunnel coupled microwave cavities that are both low loss and compatible with Josephson junction mediated particle interactions. We introduce a synthetic gauge field for the photons by coupling the cavities to tuned ferrite spheres made of yttrium iron garnet (YIG). We employ seamless 3D microwave cavities all machined from a single block of niobium so our metamaterial is scalable and directly compatible with the cQED toolbox. After observing topologically protected chiral edge states with microsecond lifetimes circling the superconducting lattice, we now push to couple qubits to lattice sites in order to both add onsite interactions and single photon sources.

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Clai Owens  
University of Chicago

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