

Abstract Submitted  
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**Optical Lattice Hamiltonians for Relativistic Quantum Electrodynamics** ELIOT KAPIT, ERICH MUELLER, Cornell University — We show how interpenetrating optical lattices containing Bose-Fermi mixtures can be constructed to emulate the thermodynamics of 2+1d quantum electrodynamics (QED3). We present a model of neutral atoms on planar lattices whose low energy effective action reduces to that of photons coupled to Dirac fermions. We overview the properties of QED3 and discuss how two of its most interesting features, chiral symmetry breaking and Chern-Simons physics, could be observed experimentally in our cold atom system.

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