1167-81-318 **Joseph E Kraisler*** (jek2199@columbia.edu). *Localization of one and two photons in discrete quantum systems.* Preliminary report.

The localization of electrons in disordered potentials has been a hot topic in mathematics and physics since the landmark work of P. W. Anderson in the late 1950s. In part due to modern advances in photonics, localization of electromagnetic waves in disordered media has also been heavily studied, often starting from Maxwell's equations with random coefficients.

In this paper we consider a discrete model of a quantized scalar field coupled to a lattice of identical two level atoms with random number densities. We show that the Hamiltonian restricted to a subspace of states containing at most one photon has only pure point spectrum for energies E in an interval centered at the fundamental frequency of the atoms, Ω, with radius that increases with the coupling between field and the matter.

When the Hamiltonian is restricted to the subspace of states containing at most two photons, we find that the spectrum is pure point for energies E in an interval centered at 2Ω with a radius that increases with the strength of the coupling between the field and the matter, as long as there is a minimal strength of coupling. (Received March 09, 2021)