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Breaking Time Reversal Symmetry in Superconducting Microwave Cavities BRENDAN SAXBERG, CLAI OWENS, AMAN LACHAPELLE, ALEX MA, JON SIMON, DAVID SCHUSTER, University of Chicago — In this talk we present our work towards realizing three dimensional high Q, superconducting cavities to be employed in topological circuit QED lattices. In order to generate these kinds of lattices, we developed time-reversal symmetry breaking cavities that require an external magnetic field. We coupled magnon excitations in spheres of the ferrite Yttrium Iron Garnet (YIG) to microwave cavity fields in order to break the degeneracy between modes that precess with different handedness. The YIG sphere only couples strongly (˜1GHz) to cavity modes that precess with the same handedness. We explore the use of type II superconductors with high critical fields and methods of focusing the magnetic field to reduce the degradation of the Q in the presence of a magnetic field.

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