Abstract Submitted
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Topological phase transitions in superradiance lattices HAN CAI, Texas AM Univ — Topological phases of matter are of fundamental interest and have promising applications. Fascinating topological properties of light have been unveiled in classical optical materials. However, the manifestation of topological physics in quantum optics has not been discovered. Here we study the topological phases in a two-dimensional momentum-space superradiance lattice composed of timed Dicke states (TDSs) in electromagnetically induced transparency (EIT). By periodically modulating the three EIT coupling fields, we can create a Haldane model with in situ tunable topological properties, which manifest themselves in the contrast between diffraction signals emitted by superradiant TDSs. The topological superradiance lattices provide a controllable platform for simulating exotic phenomena in condensed matter physics and offer a basis of topological quantum optics and novel photonic devices.

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