Abstract Submitted
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Two-dimensionally confined topological edge states in photonic crystals[1] SABYASACHI BARIK, HIROKAZU MIYAKE, WADE DEGOTTARDI, EDO WAKS, MOHAMMAD HAFEZI, Univ of Maryland-College Park — Topologically-protected edge states were initially studied in condensed matter systems, but more recently they have also been experimentally realized in photonic systems operating at optical frequencies. A major goal in the field of topological photonics is to couple such topological photonic edge states with quantum emitters, which is expected to give rise to exotic phenomena such as many-body position-independent scattering, dimerization of driven emitters, and fractional quantum Hall states, and could be a platform for robust quantum information processing. Towards this goal, we will present our results from numerical simulations of a new photonic crystal design we proposed which gives rise to topological edge states in a dielectric material which is compatible with epitaxially-grown quantum emitters in a planar geometry. The simulations show that the system possesses helical edge states that is robust to certain types of disorders. We will also report on our experimental progress, where we have observed the robustness of transmission spectra of topological waveguides made of InP membranes embedded with InAs quantum dots.

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