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Abstract for an Invited Paper
for the DAMOP17 Meeting of
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Photonic Landau Levels in Curved Space

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I will present recent work realizing topological phases of photons in curved space. The talk will focus on our recent exploration of Landau levels on a conical surface, generated using a non-planar (twisted) optical resonator to induce a synthetic magnetic field for optical photons, and employed to validate the Wen-Zee action describing the interplay of manifold curvature and magnetic fields. I will then describe experiments demonstrating interactions between individual resonator photons mediated by cavity Rydberg electromagnetically induced transparency (cReit). I will conclude with an outlook on marrying twisted resonators and cReit to assemble topological few-body states either photon-by-photon or through engineered photonic thermalizers. This work showcases the unique possibilities for Hamiltonian engineering and control in the photonic sector, a provides a taste of ongoing and upcoming breakthroughs in photonic quantum materials.