Abstract Submitted
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Local Measurements of the Topological Invariants of a Quantum Hall System[1] NATHAN SCHINE, MICHELLE CHALUPNIK, James Franck Institute and the Department of Physics, University of Chicago, TANKUT CAN, Initiative for the Theoretical Sciences, The Graduate Center, CUNY, ANDREY GROMOV, Kadanoff Center for Theoretical Physics and Enrico Fermi Institute, University of Chicago, JONATHAN SIMON, James Franck Institute and the Department of Physics, University of Chicago — Nontrivial topology undergirds a multitude of intriguing phenomena in condensed matter and AMO physics. A single topological invariant may be appear in multiple apparently unrelated observables—for instance, in integer quantum Hall systems, the Chern number appears in the bulk transverse (Hall) conductivity, the presence of robust chiral edge modes, the transport of quantized charge, and more, each of which teaches us about the physical implications of topology. Generic quantum Hall materials support two additional topological invariants, the mean orbital spin and central charge. We describe and perform local, real-space measurements of all three invariants in photonic Landau levels. The techniques used are compatible with strong interactions provided by cavity Rydberg electromagnetically induced transparency, and offer new perspectives for the characterization of exotic topological materials.

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