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Chern Numbers Hiding in Time of Flight Images[1] INDUBALA SATIJA, ERHAI ZHAO, PARAG GHOSH, George Mason university, NOAH BRAY-ALI, Joint Quantum Institute, National Institute of Standard and Technology — Since the experimental realization of synthetic magnetic fields in neural ultracold atoms, transport measurement such as quantized Hall conductivity remains an open challenge. Here we propose a novel and feasible scheme to measure the topological invariants, namely the chern numbers, in the time of flight images. We study both the commensurate and the incommensurate flux, with the later being the main focus here. The central concept underlying our proposal is the mapping between the chern numbers and the size of the dimerized states that emerge when the two-dimensional hopping is tuned to the highly anisotropic limit. In a uncoupled double quantum Hall system exhibiting time reversal invariance, only odd-sized dimer correlation functions are non-zero and hence encode quantized spin current. Finally, we illustrate that inspite of highly fragmented spectrum, a finite set of chern numbers are meaningful. Our results are supported by direct numerical computation of transverse conductivity.

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