

Measuring quantized circular dichroism in ultracold topological matter

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The topology of two-dimensional materials traditionally manifests itself through the quantization of the Hall conductance, which is revealed in transport measurements. Recently, it was predicted that topology can also give rise to a quantized spectroscopic response upon subjecting a Chern insulator to a circular drive: Comparing the frequency-integrated depletion rates associated with drives of opposite orientations leads to a quantized response dictated by the topological Chern number of the populated Bloch band. In this talk, I will present our first experimental demonstration of this intriguing topological effect, using ultracold fermionic atoms in topological Floquet bands [1]. In addition, our depletion-rate measurements also provide a first experimental estimation of the Wannier-spread functional, a fundamental geometric property of Bloch bands. Our results establish topological spectroscopic responses as a versatile probe, which could be applied to access the geometry and topology of many-body quantum systems, such as fractional Chern insulators.

[1] L. Austeria *et. al.*, arXiv:1805.11077 [cond-mat.quant-gas] (2018).