

Anyons Everywhere

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I will discuss fractional Chern insulators, a topologically ordered phase of matter long sought and first discovered in moiré materials, with an emphasis on their anyonic excitations and how they differ from the Landau level. Starting with a microscopic model of twisted MoTe_2 , I will present calculations of the anyon gap and dispersion relation, which exhibit a Hofstadter-like periodicity due to the fractionalization of the electron charge in the presence of a moiré potential. I will then move to rhombohedral graphene/hBN superlattices, where the origin of the parent Chern insulator has come under intense debate. I will show that the effective moiré potential is interaction-induced via a mechanism we term the moiré capacitor effect. Finally, I will present minimal models where controlled calculations of anyon dispersion and anyon pairing are possible.