Designer Hamiltonians for fractional topological phases

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Abstract:

Since the early seminal work of Laughlin on the fractional quantum Hall effect, a wave function perspective on fractional quantum states of matter has been established as a predominant direction of research in strongly correlated quantum systems. In turn, having a promising wave function at hand that potentially describes an interesting quantum state of matter, the reverse engineering problem arises how to develop microscopic models for such states. In the talk, we will elaborate on this kind of approach in the field of fractional quantum Hall effect, fractional Chern insulators, and spin liquids. In particular, such designer Hamiltonians for fractional topological phases allow us to pinpoint the core ingredients to define microscopic requirements whose fulfillment would nurture the hope for experimental realization