

UCLA Department of Physics & Astronomy

# COLLOQUIUM

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## The surprising effectiveness of topology in the science of quantum materials

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It is a remarkable fact that in recent years topological concepts have played an increasingly prominent role in quantum condensed matter physics. I will review several examples that underscore this trend, including the discovery of the fractional quantum Hall effect in zero magnetic field in moiré structures and Dirac and Weyl semimetals in solids. I will also sketch recent ideas based on many-body quantum entanglement that have revealed hidden connections between different topological phenomena, and, time permitting, how this has enabled the creation of non-Abelian topological phases on quantum devices.