Abstract:

The quantum Hall effect manifest itself when electrons are confined to two dimensions and immersed in a magnetic field: the electrical conductance takes precisely quantized values, which are integer multiples of the quantum of conductance. This has now become one of the archetypal systems where topology plays a crucial role. A powerful platform for easily controlling and engineering quantum systems, and in particular topological models, is nowadays represented by synthetic matter (e.g., ultracold atoms, photonics systems, metamaterials, etc.). In this talk, I will discuss on recent developments and my own theoretical contribution to the field of topological quantum matter, from the design to the probing of quantum-Hall type phenomena.