

Speaker: Pablo Sala (speaker will be remote)

Title: Spatially modulated symmetries on a lattice

Abstract: Unconventional conservation laws, like for example dipole moment conservation, have been found to lead to unexpected phenomena in- and out-of-equilibrium. In this talk, we review the notions of multipole and subsystem symmetries and extend them to more general spatially-modulated ones, providing simple lattice models realizing them. As solutions of discrete recurrence relations, we uncover new instances that include (quasi)-periodic modulations of a local density as well as localized symmetries at the boundary of the system. Seeking to understand their effect in the long-time dynamics, we numerically study stochastic cellular automata evolution that obeys such symmetries. We will first introduce the key ideas using one-dimensional systems, and then extend our results to higher dimensions. In higher dimensions, these modulated symmetries can take the form of lines and surfaces of conserved momenta. They give rise to exotic forms of sub-diffusive behaviour with a rich spatial structure influenced by lattice-scale features. Symmetries localized at the edges on the other hand, can lead to correlations that are infinitely long-lived at the boundary, resembling the physics of strong zero modes in topological quantum systems.