Plenary Talk PLV VI Wed 14:00 HSZ 01

Topological defects in active and living matter — •M Cristina Marchetti — University of California Santa Barbara, USA

Topological defects play a central role in the physics of many materials, including magnets, superconductors and liquid crystals. In oriented active fluids defect acquire a new life as spontaneous local currents turn them into self-propelled particles that drive chaotic flows. There is growing evidence that living systems may exploit this relation between structure and dynamics and use defects to localize stress or perform specific functions. The intimate connection between defect textures and active flow suggests that properties of active materials can be engineered by controlling defects. In this talk I will describe our work on formulating the dynamics of active topological defects as particle-like excitations, their role in driving the turbulent-like dynamics of active liquid crystals, and recent approaches to manipulate the defect dynamics in both space and time.