

Physics Colloquium

22nd April 2020 at 4.00PM

WEBEX Conference

Talk by Dr. Francesca Serra

(invited by: Prof. Jan Lagerwall)

Cells as living liquid crystals and the role of topological defects

Certain types of living cells are elongated objects, able to align with each other spontaneously. All these characteristics make them remarkably similar to liquid crystals, fluids made of rod-like molecules that possess long-range orientational order. However, unlike traditional liquid crystals, cells can deform, move and multiply. In this “special” liquid crystal system we look at topological defects, i.e. the regions where the alignment of cells is frustrated or suppressed. These are important because of their role in regulating cell extrusion and apoptosis. We use topographical cues to guide the local orientation of the cells in monolayers, and we characterize the liquid crystallinity of various cell types and their arrangement near topological defects. From our observations, we intend to correlate the liquid crystal properties of the monolayers with the biological properties of the cells.

About the speaker

Dr.Francesca Serra is an experimental soft matter physicist. She got her degree in physics at the University of Parma, and her PhD at the University of Cambridge, where she studied photo-sensitive liquid crystals and liquid crystal elastomers. In her postdoctoral research at the University of Milan and at the University of Pennsylvania, she studied topological defects and colloidal assembly in liquid crystals. In 2017 she became an assistant professor at Johns Hopkins University, where her research group studies "traditional" as well as "living" liquid crystals, with a special focus on the control of topological defects.