

DY 12: Talk Pascal Silberzan

Time: Tuesday 9:30–10:00

Location: H3

Invited Talk

DY 12.1 Tue 9:30 H3

Active Cell Nematics: Architectures and flows. — ●PASCAL SILBERZAN — Institut Curie, Paris, France

When cultured in monolayers, spindle-shaped cells such as NIH-3T3 fibroblasts form domains of common orientation. These domains don't fuse because of the presence of intrinsic topological defects characteristic of these 2D nematic phases. The characteristic size of these domains is very large compared to a cell size (up to 0.5 mm). Confining these fibroblasts in stripes whose width is smaller than this length ensures a

defect-free nematic ordering whose director aligns with the stripe's direction. However, in the same confinement condition, other cell types adopt a more complex nematic architecture and develop spontaneous shear flows. This particular situation is reminiscent of in vivo observations where cancer cells escaping collectively from a tumor can locally migrate in antiparallel directions within the same strand. Confining the cells in circular domains imposes a topological charge that results in a pair of defects whose position indicates that cell activity is eventually overcome by friction with the underlying substrate.