Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Active Cellular Nematics GUILLAUME DUCLOS, CHRISTOPH ERLENKAEMPER, SIMON GARCIA, HANNAH YEVICK, JEAN-FRANOIS JOANNY, PASCAL SILBERZAN, Physico-Chimie Curie, UMR 168, UPMC, Institut Curie, BIOLOGY INSPIRED PHYSICS AT MESOSCALES TEAM, PHYSICAL APPROACH OF BIOLOGICAL PROBLEMS TEAM — We study the emergence of a nematic order in a two-dimensional tissue of apolar elongated fibroblast cells. Initially, these cells are very motile and the monolayer is characterized by giant density fluctuations, a signature of far-from-equilibrium systems. As the cell density increases because of proliferation, the cells align with each other forming large perfectly oriented domains while the cellular movements slow down and eventually freeze. Therefore topological defects characteristic of nematic phases remain trapped at long times, preventing the development of infinite domains. By analogy with classical non-active nematics, we have investigated the role of boundaries and we have shown that cells confined in stripes of width smaller than typically 500 m are perfectly aligned in the stripe direction. Experiments performed in cross-shaped patterns show that both the number of cells and the degree of alignment impact the final orientation. *Reference*: Duclos G., Garcia S., Yevick H.G. and Silberzan P., "Perfect nematic order in confined monolayers of spindle-shaped cells", Soft Matter, 10, 14, 2014

Guillaume Duclos
Physico-Chimie Curie, UMR 168, UPMC, Institut Curie

Date submitted: 05 Nov 2015 Electronic form version 1.4