

Active Matter: *evading the decay to equilibrium*

Julia M Yeomans

The Rudolf Peierls Centre for Theoretical Physics

Clarendon Laboratory, Parks Road, Oxford, OX1 3PU, UK

Julia.Yeomans@physics.ox.ac.uk

Biological systems avoid equilibrium by taking chemical energy from their surroundings and using it to do work. Cells organise intra-cellular components into the structures that allow them to grow, reproduce and move. Tissues, collections of cells, differentiate locally as they develop to perform the complex functions of different organs.

Active systems, also exist out of thermodynamic equilibrium. Dense active matter shows complex collective behaviour and mesoscale turbulence, the emergence of chaotic flow structures characterised by high vorticity and self-propelled topological defects. I shall describe the physics of dense active matter and discuss possible links to motility and morphogenesis in biological contexts.