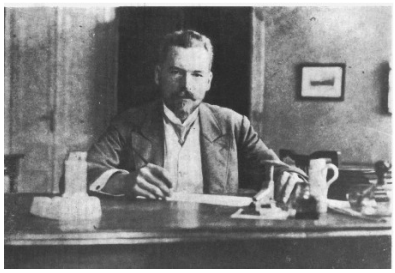

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Active Interface Equations

Thursday, 19 September 2019 09:30 (30 minutes)

In this work we consider the role of active inclusions in a growing interface, for example membrane binding proteins which catalyse growth in the plasma membrane of eukaryotic cells. The interface is thus rendered active and is described by two coupled fields: the height field of the interface and the density of the inclusions. The equations generalise to active interface growth the Kardar Parisi Zhang equation which descibes nonequilibrium growth and also represents many other systems driven out of out of equilibrium. In our model inclusions gravitate towards minima of the height field and then catalyse growth which generates interface waves. This leads to complex kinematic waves and pattern formation and the proteins are able to surf the waves they create. The interface width displays a novel superposition of scaling and sustained oscillations distinct from KPZ physics.

F Cagnetta, M. R. Evans and D Marenduzzo Phys. Rev. Lett. 120, 258001 (2018)
F Cagnetta, M. R. Evans and D Marenduzzo Phys. Rev. E 99, 042124 (2019)

Summary

Primary author: Prof. EVANS, Martin (University of Edinburgh)

Presenter: Prof. EVANS, Martin (University of Edinburgh)

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