

ICTS Seminar

Title : Dynamics of active matter: From cell monolayer to chemically active polymer

Speaker : Debarati Sarkar (Forschungszentrum Jülich, Germany)

Date : Wednesday, 7th April 2021

Time : 03:30 pm

Abstract : Active matter system is such kind of system which consists of some active components in it. These active units are able to convert any form of internal energy into mechanical energy, and thus helps to execute the self-propulsion. In nature, active matters are found in various shapes and sizes as from vesicles to polymers. In this talk, I will first focus on dynamics of the cell monolayer which play the key role in many biological processes. Madin-Darby canine kidney (MDCK) cells have been established as one model system to study collective cell migration. On the substrates, cells expand with time and displaying fascinating motile behavior however remain extremely cohesive in nature. We propose a minimalistic particle based model which results a fluid like colony while remaining cohesive. Moreover these collective migrations of cells often exhibit a transition from jammed to unjammed phase and vice-versa. We propose an elastic vesicle model to understand this dynamics. In the second part of my talk, I will focus on the various dynamics executed by the chemically active polymer. Two different aspects I will talk about, (1) loop formation and (2) spontaneous oscillation which are often visible in many biopolymers.

References

- [1] X. Trepat et al., Nat. Phys. 5(6), 426–430 (2009).
- [2] M. Basan et al., Proc. Natl. Acad. Sci. USA 110(7), 2452–2459 (2013).
- [3] G. S. Redner, A. Baskaran, and M. F. Hagan, Phys. Rev. E 88, 012305 (2013).
- [4] G. Rückner and R. Kapral, Phys. Rev. Lett. 98, 150603 (2007).
- [5] D. Sarkar, S. Thakur, Y.-G. Tao and R. Kapral, Soft Matter 10, 9577 (2014).

Venue : Please click on the link to join the seminar

<https://zoom.us/j/96771840623?pwd=ZEpDbkkyQURBVS9uR00vUHF0d0FEdz09>

Meeting ID: 967 7184 0623

Passcode: 396211