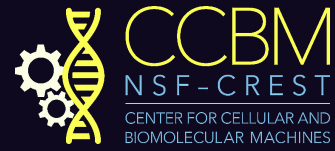




Soft Living Active and Adaptive Matter



Metachronal waves in swarms of nematode *Turbatrix aceti*

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Abstract:

There is a recent surge of interest in the behavior of active particles that can at the same time align their direction of movement and synchronize their oscillations, known as swarmalators. While analytical and numerical models of such systems are now abundant, no real-life examples have been shown to date. I will present an experimental investigation of the collective motion of the nematode *Turbatrix aceti*, which self-propel by body undulation. I will show that under favorable conditions these nematodes can synchronize their body oscillations, forming striking traveling metachronal waves which, similar to the case of beating cilia, produce strong fluid flows.

I will demonstrate that the location and strength of this collective state can be controlled through the shape of the confining structure; in our case the contact angle of a droplet. This opens a way for producing controlled work such as on-demand flows or displacement of objects. I will illustrate this by a practical example: showing that the force generated by the collectively moving nematodes is sufficient to change the mode of evaporation of fluid droplets, by counteracting the surface-tension force, which allow us to estimate its strength.

Date:
11/08/2021

Time:
9:00 AM-10:15 AM (PT)

About the speaker:

Anton Peshkov is a postdoctoral associate working at the University of Rochester in collaboration with Prof. Stephen Teitel and Prof. Alice Quillen. His current work is concentrated on the experimental investigation of biological active matter and numerical investigation of the jamming transition in granular matter.

He has received his PhD from Sorbonne University, working at the CEA Saclay on continuous models of active matter. His past work includes analytical, numerical, and experimental investigation of active and granular systems.



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