

סמינר - SEMINAR

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 10.06.2019
(ז' בסיון תשע"ט), בניין דן קאהן, אודיטוריום 1, 14:30.

מרצה:

Dr. Matvey Morozov

LadHyX, Ecole Polytechnique
Palaiseau, France

על הנושא:

Chaotic dynamics and "decision making" in individual chemically active microdrops

The seminar will be given in English

להלן תקציר ההרצאה:

A chemically active microdrop that is suspended in the bulk of a reagent solution is an example of a non-equilibrium physicochemical system akin to cells and vesicles. Owing to their non-equilibrium nature, active drops may excite the flow in the surrounding fluid even in the absence of preexisting asymmetries, such as gravity or inhomogeneous interfacial properties. In experiments, this spontaneous flow excitation results in active drops self-deforming or self-propelling along a straight, helical, or chaotic trajectory. In this talk, we will use theoretical tools to elucidate how active drops "decide" what to do. We will start with a weakly nonlinear analysis of different modes of spontaneous symmetry breaking in active drops and demonstrate analytically how the choice between self-propulsion and self-deformation is made. Then we will convert our asymptotic insight into a fully nonlinear spectral model of the droplet dynamics and employ this model to consider the drops away from the threshold of initial symmetry breaking. Basing on the results of the numerical investigation of the model, we will discuss the transition to chaos and make a physical argument why the Marangoni effect might not be the only flow excitation mechanism in active drops. Finally, we will apply our findings to assemble a model of a liquid crystal drop that features coupled dynamics of the flow and director fields and allows for straight, helical, and chaotic self-propulsion trajectories.

מארח: פרופ' אלכס אורון

בברכה,

פרופ' א"א אתי סאס

מרכז הסמינרים