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Mechano-chemical interactions in a one-dimensional description of intracellular reaction-diffusion systems

Understanding self-organization processes in biological systems, such as intracellular pattern formation, is a key challenge in biophysics. For confined systems with bulk-boundary coupling, it is the intricate interplay between membrane geometry and intracellular protein patterns that controls the dynamics of the system. We present a reduction technique to study confined reaction-diffusion systems with bulk-boundary coupling and mechano-chemical feedback in a one-dimensional description. Applying phase-space- and perturbative linear stability analysis, we predict geometrically controlled pattern formation and mode selection generating either polar or bipolar protein patterns in cells. Moreover, we study the effects of geometric deformations on coarsening dynamics, allowing for wavelength selection, and mechano-chemical feedback mechanisms.

The event will take place in a hybrid format. For information on how to access the event, please contact: henning.reinken@itp.tu-berlin.de

Wednesday, 15.06.2022 · 14:15h · EW 733/via Zoom

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