

FURUKAWA LAB.

Physics of Complex Fluids



Department of Fundamental Engineering

Soft matter physics

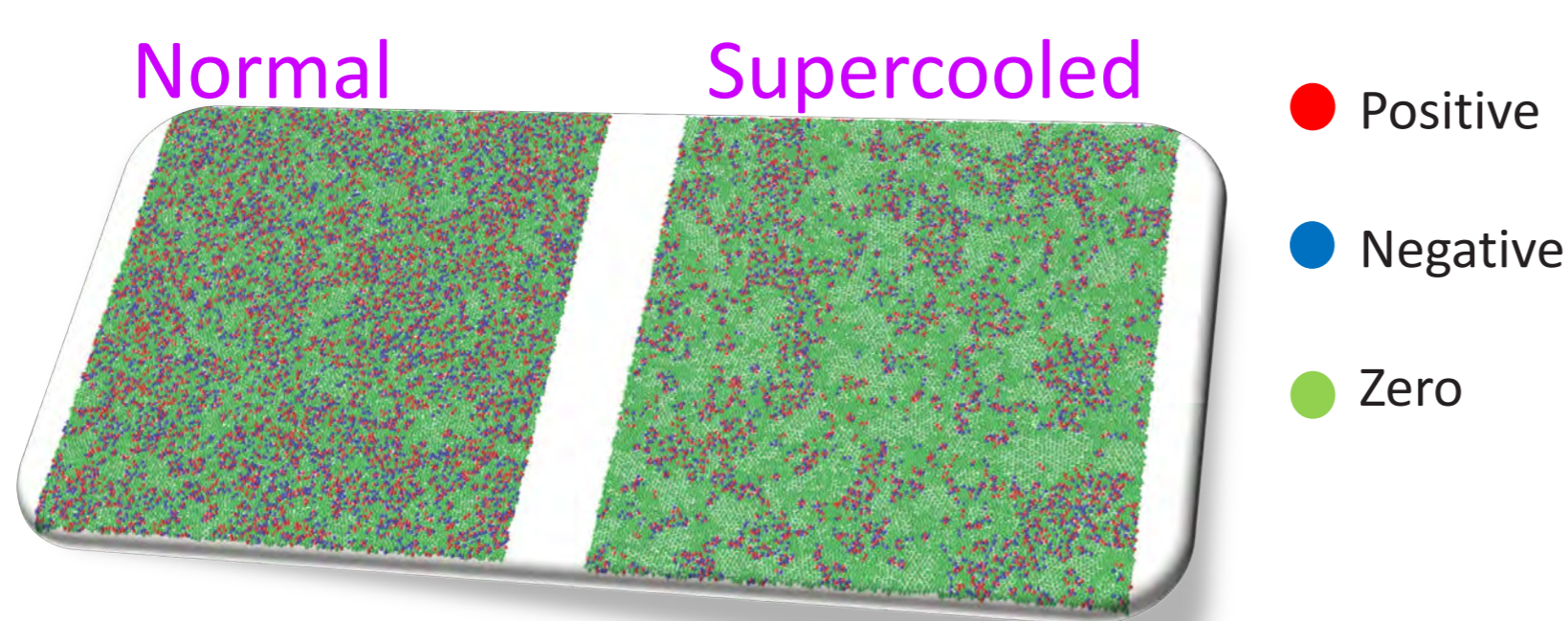
Department of Applied Physics, Graduate School of Engineering

<http://www.complexfluid.iis.u-tokyo.ac.jp>

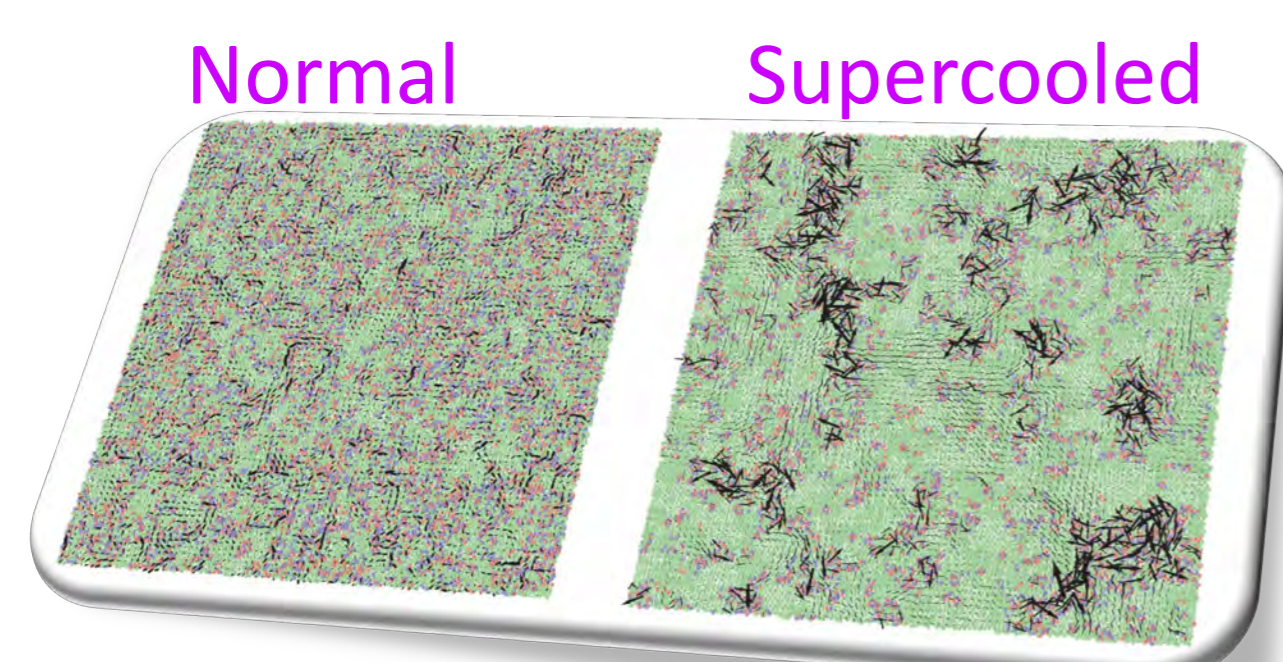
We theoretically investigate non-linear and non-equilibrium phenomena in various soft materials and complex fluids, from glasses, colloids and granular systems to bacteria.

In recent years, we have primarily focused on the following problems:

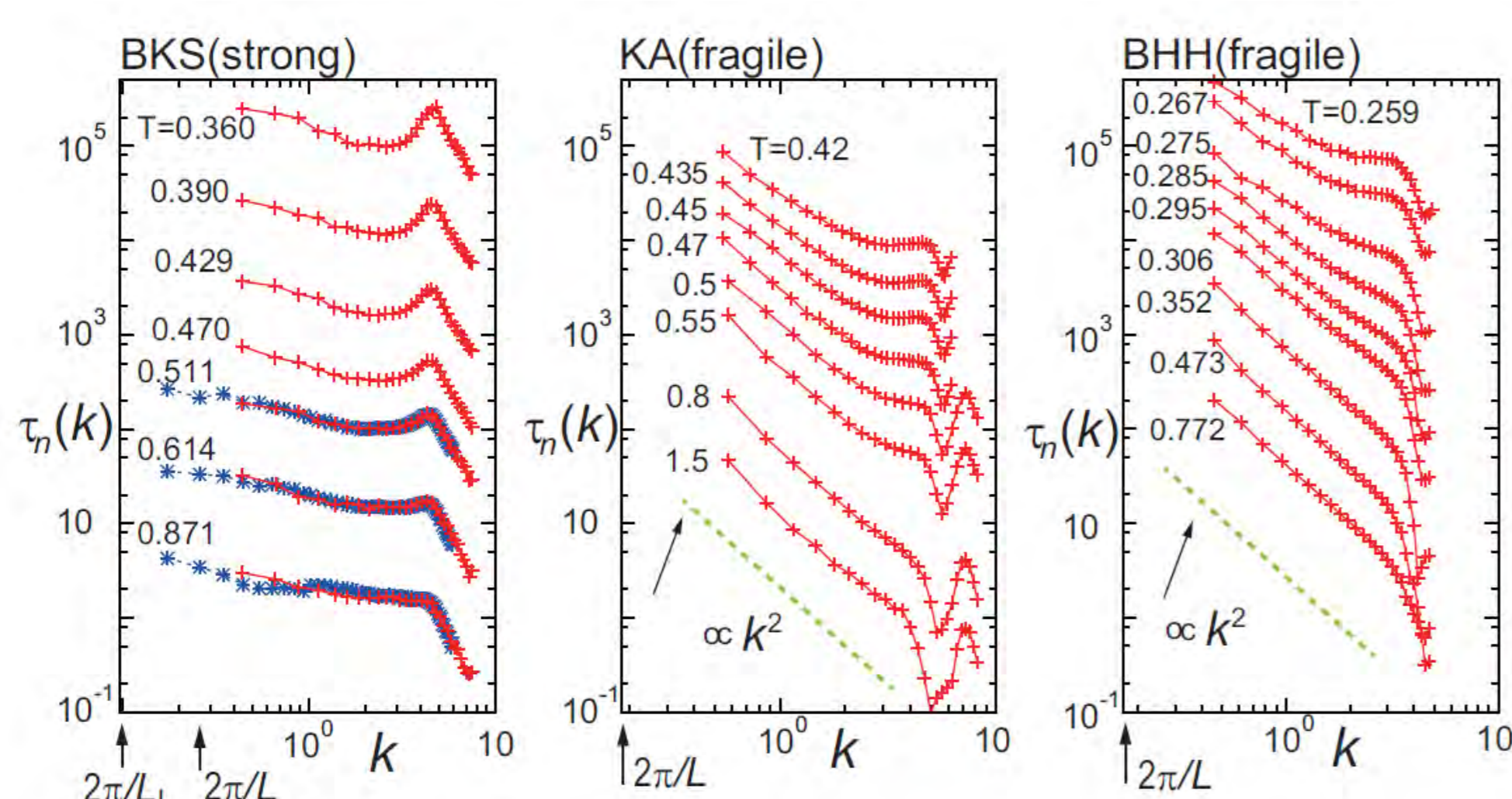
- (1) The origin and role of spatial correlations of anomalous hydrodynamic transport in supercooled liquids
- (2) Non-Newtonian rheology of glassy and granular materials (shear-thinning, shear-thickening, fracture, etc.)
- (3) The effects of (near-field) hydrodynamic interactions on the collective dynamics of bacterial suspensions.



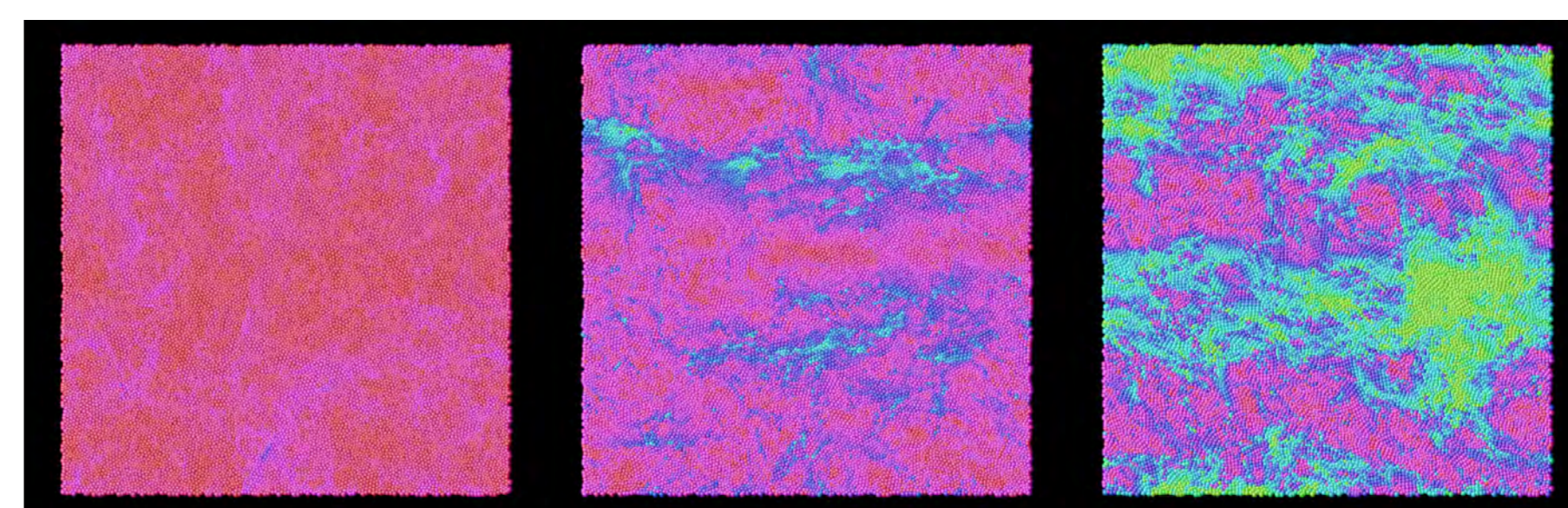
Spatial pattern of the exchange event for τ_α



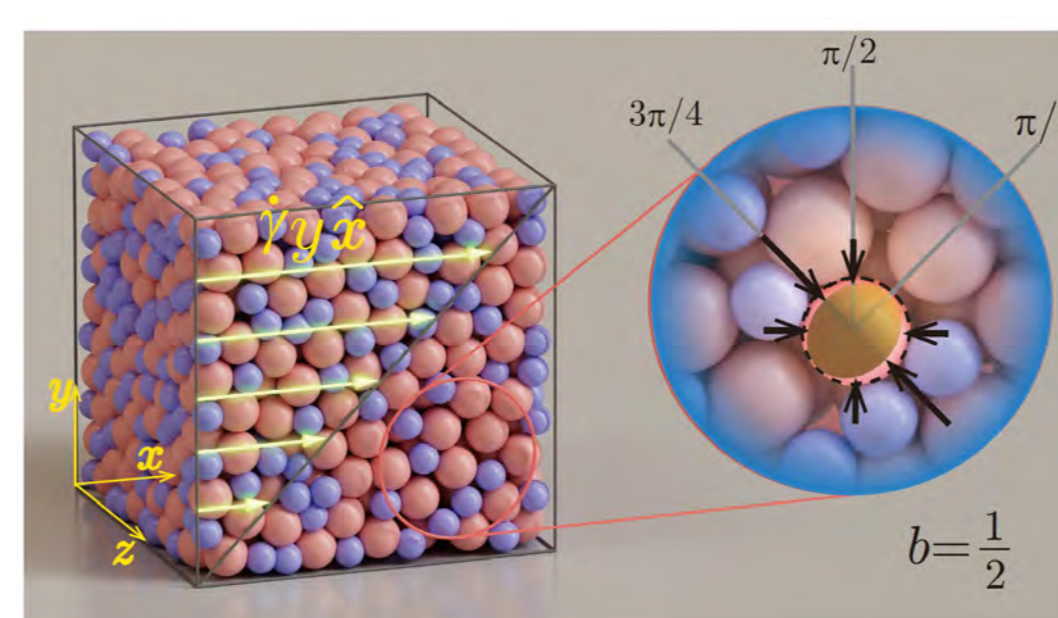
Displacement vector field



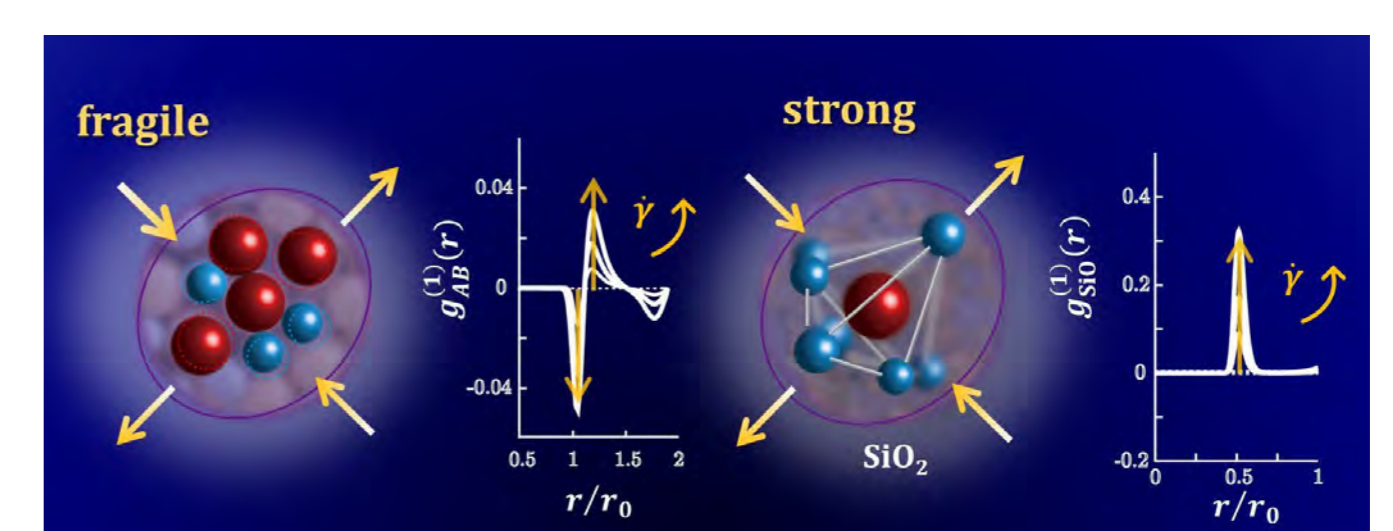
Relaxation time of density fluctuations



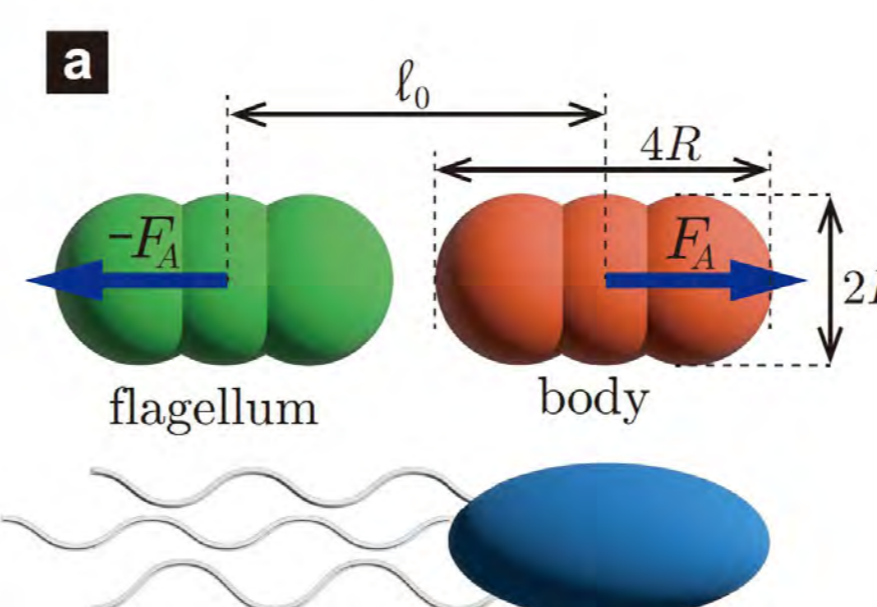
Shear band formation in supercooled liquids



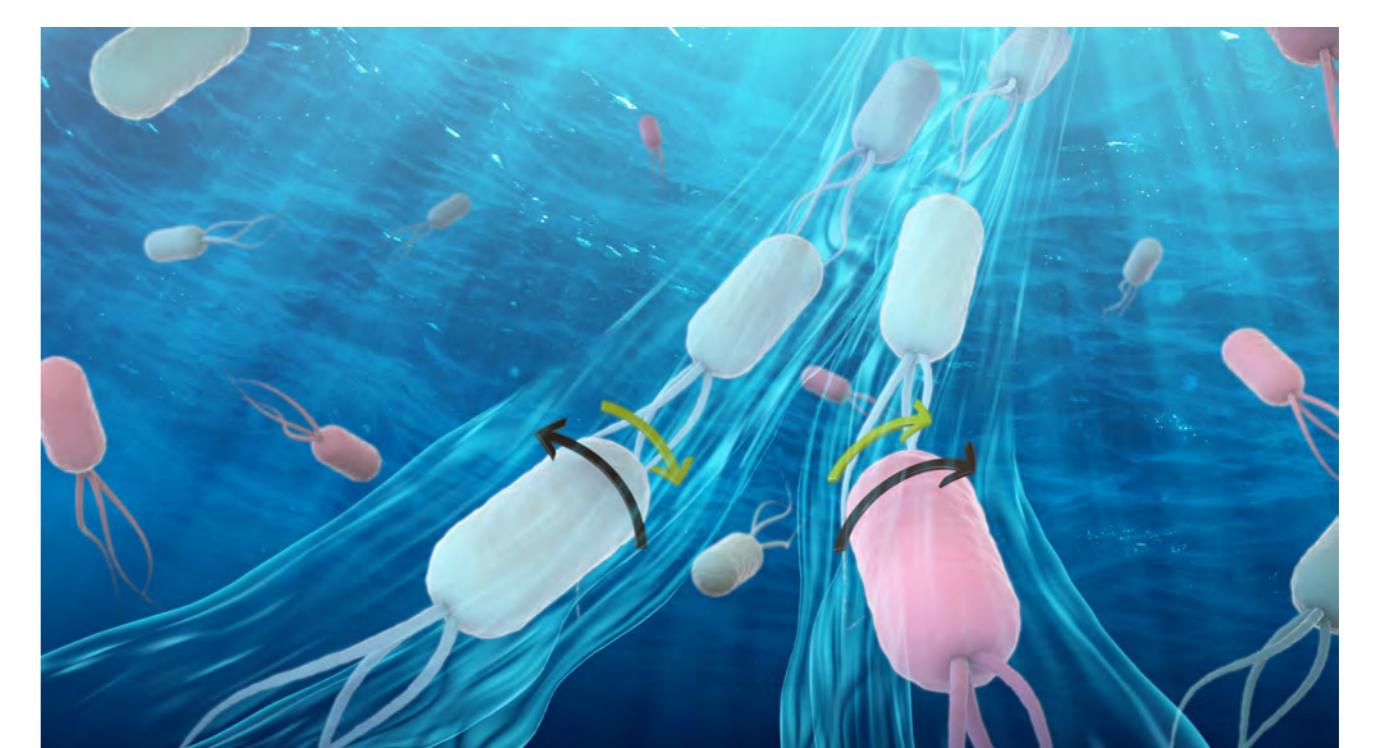
Shear-induced reduction in the effective volume fraction



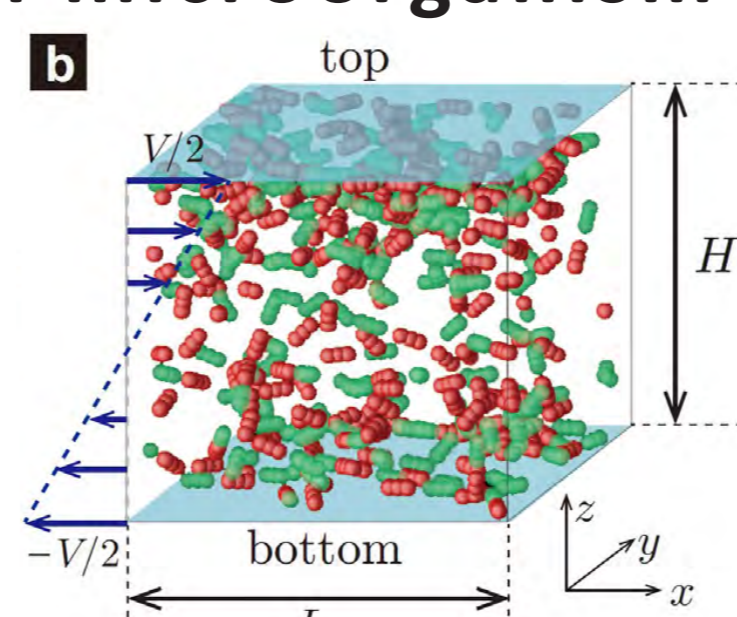
Particle configuration under shear flow



Minimal microorganism model



Hydrodynamic effect on the collective dynamics of bacterial suspensions



Rheology of active suspensions