

# Assembly behavior of Janus particles and the role of hydrodynamic interactions

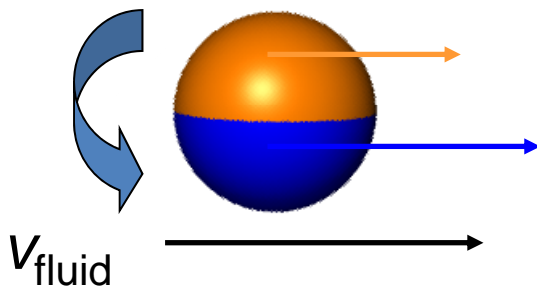
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# Hydrodynamics of Janus Particles

- We employ computer simulations to explore the combined effects of hydrodynamics and particle aggregation on sedimentation of Janus particles
- Hydrophilic and hydrophobic surface areas result in non-uniform boundary conditions on the particle surface and lead to orientation-dependent inter-particle forces.



- “Stickier” hydrophilic boundaries are more affected by tangential motion of the fluid, resulting in torque from unbalanced drag.

# Summary

- Hydrodynamics of Janus particles can be studied via multiparticle collision dynamics (MPC), including an arbitrary variation of the boundary conditions (ranging from stick to slip conditions)
- Individual sedimenting Janus particles exhibit strong preferential orientation, but in aggregates this tendency depends on symmetry breaking
- Outlook:
  - Can one create colloidal crystals with oriented Janus particles?
  - How do larger aggregates orient under flow?
  - Are these phenomena directly observable in experiments?

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