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Dynamic self-organization of confined autophoretic particles[1] ANTHONY MEDRANO, University of Southern California, SBASTIEN MICHELIN, Ecole Polytechnique, EVA KANSO, University of Southern California — We study the behavior of chemically-active Janus particles in microfluidic *Hele-Shaw*-type confinement. These micron-scale chemical motors, when immersed in a fuel-laden fluid, produce an ionic chemical field which leads to motility and consequently a local fluid flow. In unconfined settings, experimental and computational studies have shown these particles to spontaneously self-organize into crystal structures, and form into asters of two or more particles. Here, we show that geometric confinement alters both the chemical and hydrodynamic signature of the particles in such a way that their far-field effects can be modeled as source dipoles. Each particle moves according to its own self-propelled motion and in response to the chemical and hydrodynamic field created by other particles. Two interaction modes are observed: self-assembly into quasi-static crystals and into dynamically-evolving chains. We discuss the conditions that lead to these modes of interactions and the phase transitions between them for various Janus particle concentrations.

[1]The National GEM Consortium

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