

Abstract Submitted  
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**Motion of Janus sphere in two-dimensional confinement** AKASH CHOUDHARY, CHAITHANYA K.V.S., PUSHPAVANAM S, Indian Institute of Technology Madras, SÉBASTIEN MICHELIN, LadHyX, Ecole Polytechnique, Paris, France — Janus particles propel themselves by generating concentration gradients along their surface. The corresponding concentration and hydrodynamic field decay as  $O(1/r)$  and  $O(1/r^2)$ , respectively. Since these disturbances are long-ranged, even a remote interaction with confined geometry can have a profound effect on the self-propulsion. In this work, we theoretically study the motion of Janus sphere through a Hele-Shaw confinement; the particle is placed at an arbitrary location between walls which are bounded in  $y$ -direction and infinite in  $x$  &  $z$ -directions. Using the method of reflections in conjunction with Faxen transformations, we study the competition between phoretic and hydrodynamic interactions. The presence of boundaries results in a modification of translation velocity and endows the Janus particle with a rotational velocity. Furthermore, we analyze the effects of mobility (i.e. solute-particle interaction) and surface activity coverage.

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