Abstract Submitted
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Premelting controlled active matter in ice JEREMY VACHIER, Nordita, Royal Institute of Technology and Stockholm University, Stockholm 106 91, Sweden, JOHN WETTLAUFER, Nordita, Royal Institute of Technology and Stockholm University, Stockholm 106 91, Sweden / Yale University, New Haven, Connecticut 06520, USA — A collection of self-propelled particles can undergo complex dynamics due to hydrodynamic and steric interactions. In the case of a foreign particle inside a subfreezing solid, such as a particle in ice, a premelted film forms around it allowing the particle to migrate under the influence of an external temperature gradient, which is a phenomenon called *thermal regelation*. It has recently been shown that the effect of biological impurities and their migration within an ice column can accelerate melting and migrate faster in turn. This is a positive feedback loop, where the ice melting initiates the migration of algae and diatoms, which also increases its melting. We have previously shown that the effect of regelation plays a major role in the migration of inert particles and impurities inside ice with important environmental implications. We re-cast this class of regelation phenomena in the stochastic framework of active Brownian dynamics.

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