Abstract Submitted
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Flow and mixing induced by tethered magnetic filaments MARC FERMIGIER, AVIN BABATAHERI, OLIVIA DU ROURE, ESPCI — Arrays of motile cilia are used for the propulsion of microprganisms and also for the production of a leftward flow on mammal embryos. We have constructed a physical model of these ciliary arrays, based on linear colloidal structures made of micron-sized superparamagnetic particles (fleximags). These fleximags are attached at one end on the wall of a capillary tube. They are actuated by spatially homogeneous, but time-dependent magnetic fields. We analyze their dynamic behavior under different types of actuation (rotation, planar beating - reciprocal and non reciprocal in time) and compare the experimental results with a slender body analysis. We measure the flow induced above the array of filaments by tracking neutral tracer particles and the transport of a passive dye.

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