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Development of surfaces repelling negatively buoyant solid particles CARINA SEMMLER, ALEXANDER ALEXEEV, Georgia Institute of Technology — Using a hybrid computational method that integrates the lattice Boltzmann model for fluid dynamics and the lattice spring model for solids, we examine the motion of negatively buoyant solid microparticles in shear flow near a solid wall decorated with regularly distributed rigid posts. The posts are arranged in a square pattern and tilted relative to the flow direction. We show that when rigid posts are tilted against flow, secondary flows emerge that prevent the deposition of suspended particles on the solid surface. We probe the effect of post geometry on the development of secondary flows and identify the optimal post architecture in terms of the mass of levitated solid particles. Our results are useful for designing anti-fouling surfaces that repel colloidal particles carried by fluid.

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