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Interaction of Particles with Recirculating Flow Regions inside Cavities of Inertial Microchannels HAMED HADDADI, DINO DI CARLO, University of California Los Angeles — Confined inertial flow over cavities of a microfluidic device leads to formation of recirculating flow regions, i.e flow cells, inside cavities which can entrap particles from the free stream. Besides its significance as a fundamental problem in fluid mechanics of mixtures, understanding particle interaction with recirculating flow regions inside cavities is important in biomedical applications, such as Circulating Tumor Cell (CTC) separation and platelet deposition in arterial stenosis. In the present work, a lattice-Boltzmann model with resolved particle-corner interaction combined with microfluidic experiments enabled improved understanding of the particle exchange within flow cells in confined inertial flow. Formation of a limit cycle trajectory, observed in experiments and numerical simulations, is a key feature in particle accumulation. By varying the dimensions of the cavity and channel Reynolds number, The length and location of the limit cycle trajectory also varies, altering of the rate of particle exchange and level of accumulation with recirculating zones inside cavities.

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