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Three dimensional open cavity flow for the continuous separation of suspended particles JORGE A. BERNATE, Stanford University, COLIN PAUL, Johns Hopkins University, CHENGXUN LIU, LIESBET LAGAE, IMEC, KONSTANTINOS KONSTANTOPOULOS, ZACHARY GAGNON, GERMAN DRAZER, Johns Hopkins University — We present a microfluidic platform for the continuous separation of suspended particles based on their size and settling velocity, which relies on the reorientation of the flow field created by applying a pressure gradient across and along a periodic array of open cavities. The flow along the open cavities deflects different particles to a different degree depending on the extent to which they penetrate into the open cavities. Two regimes can be distinguished depending on the ratio r between the settling velocity of the particles and their velocity across the cavities. When $r \approx 1$, heavier particles settle deeper into the open cavities and deflect more than lighter ones. When $r \ll 1$, smaller particles are advected deeper into the cavities by the flow and deflect more than larger ones. We probe these regimes by separating spherical particles of different size and density at different flow rates. We show the potential of this platform to be used as a microfluidic *centrifuge* depleting RBCs and enriching spiked MCF-7 cancer cells. This platform can be easily integrated with external fields resulting in a potentially versatile technique. In particular, we use dielectrophoretic forces for the high-throughput separation of particles of the same size.

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