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Modification of inertial focusing position by the restriction effect ELODIE SOLLIER, HAMED AMINI, UCLA Bioengineering, JEAN-LUC ACHARD, CNRS LEGI, DINO DI CARLO, UCLA Bioengineering, DI CARLO'S LAB TEAM, CNRS LEGI TEAM — A recent study from Faivre et al. has demonstrated that a rapid decrease in a channel cross-section leads to a lateral deviation in deformable particles' positions downstream of the constriction. This hydrodynamic drift, or "restriction effect", has been experimentally shown for low Reynolds numbers and only deformable cells. In parallel, Di Carlo and others have shown the usefulness of inertial forces in a confined flow, especially for ordering randomly distributed bioparticles. To further study this restriction effect but under these inertial conditions, we tracked the equilibrium positions of different bioparticles and measured their deviation. Just after the restriction, a deviation is observed for red cells and unexpectedly for spherical rigid beads. 1 cm further, beads go back to their initial position but red cells remained deviated. These results are interpreted as originating in differences in particle deformability and longer time necessary for a stressed cell to recover its initial equilibrium position. These results may provide a novel and simple technique for separation of particles with similar inertial equilibrium positions but different deformability, with specific applications for high-throughput flow cytometry.

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