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Magnetophoresis-tuned diamagnetic particle focusing in ferrofluids.[1] QI CHEN, DI LI, XIANGCHUN XUAN, Clemson University — Focusing and aligning particles into a tight stream is often a necessary step prior to detecting them. Magnetic fluids including paramagnetic solutions and ferrofluids have been increasingly used for label free manipulation of diamagnetic particles in microfluidic devices. However, the current techniques for three-dimensional diamagnetic particle focusing in magnetic fluids requires the use of either two opposing magnets or a sheath flow focusing. We demonstrate in this work a sheath-free single-stream focusing of polystyrene particles in a ferrofluid flow through the use of a single permanent magnet. Moreover, the equilibrium position of the particle stream can be readily varied by changing the location of the magnet. This active magnetic focusing can potentially be combined with the passive inertial focusing for efficient three-dimensional particle alignment in a large range of flow rates.

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