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Weighing single cells in two fluids: measuring mass, volume and density FRANCISCO FEIJÓ DELGADO, WILLIAM GROVER, NATHAN CERMAK, ANDREA BRYAN, SCOTT MANALIS, Massachusetts Institute of Technology — The Suspended Microchannel Resonator (SMR) is a highly sensitive cantilever-based mass sensor shown to be capable of weighing the buoyant mass of living single cells. We have engineered SMR-based microfluidic systems to achieve consecutive weighing of single cells in two different fluids, with controlled exposure times. By choosing fluids of two different densities, the paired buoyant mass measurements are used to characterize single-cell volume, mass and density. With density precision of 0.001 g.cm^{-3}, we explore the application of our techniques to samples ranging from bacterial to mammalian cells and show that cellular density is a tightly regulated biological property within populations, up to 100-fold more so than the other size parameters.

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