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Ferrodroplets: a Global Clock for Droplet Microfluidics GEORGIOS KATSIKIS, MANU PRAKASH, Stanford University — A fluidic analogue to magnetic bubble computer memory is proposed as a novel propagation mechanism for droplet microfluidics. We designed a prototype microfluidic device where ferrofluid droplets are actuated along a 2-D plane using soft magnet patterns under the influence of rotating magnetic fields. The state of the system is dependent on occupancy of fluid droplets and the track geometry. The propagation characteristics of droplets are studied experimentally by varying operation parameters such as the magnitude and frequency of in-plane magnetic fields and the length scale of the device. The experimental findings are juxtaposed with scaling arguments and numerical simulations. Applications for this device as a universal clocking mechanism for droplet microfluidics are discussed.

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