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Magnetic Nano- and Micro- Particles in Living Cells: Kinetics and Fluctuations C. PEASE, N. CHIANG, C. PIERCE, N. MUTHUSAMY, R. SOORYAKUMAR, Ohio State Univ - Columbus — Functional nano and micro materials have recently been used not only as diagnostic tools for extracellular studies but also as intracellular drug delivery vehicles and as internal probes of the cell. To realize proper cellular applications, it is important not only to achieve efficient delivery of these materials to targeted cells, but also to control their movement and activity within the confines of the cell. In this presentation, superparamagnetic nano and micro particles are utilized as probes, with their responses to weak external magnetic fields enabling them to be maneuvered within a cell. In order to generate the required local magnetic fields needed for manipulation, the fields emanating from microscopic domain walls stabilized on patterned surface profiles are used in conjunction with weak external magnetic fields to create mobile traps that can localize and transport the internalized particle. Preliminary findings on creating the mobile traps suitable for applications to probe the interior of cells, and the responses, both Brownian fluctuations and directed motion, of particles ranging in size from 200 nm to 1 micron within HS-5 cells will be presented. Future applications to probe cellular behavior within the framework of emerging biomaterials will be discussed.

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