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High resolution phase-sensitive optical coherence microscopy tracking of magnetic microbeads for cellular mechanics VASILICA CRECEA, Department of Physics, University of Illinois at Urbana-Champaign, BENEDIKT GRAF, Department of Electrical Engineering, University of Illinois at Urbana-Champaign, QINGSHAN WEI, HYON-MIN SONG, ALEXANDER WEI, Department of Chemistry, Purdue University, STEPHEN BOPPART, Department of Electrical Engineering, University of Illinois at Urbana-Champaign — We present a real-time multi-modal near-infrared imaging technology that tracks externally induced axial motion of magnetic microbeads in mouse macrophages, human breast epithelial cells, and human breast primary ductal carcinoma cells. The imaging technique includes nanometer scale phase-sensitive magnetomotive integrated optical coherence (MM-OCM) and multiphoton (MPM) microscopy. MPM is used to visualize multifunctional microbeads based on their fluorescence, while MM-OCM detects sinusoidal displacements of the magnetic microbeads induced by a magnetic field. This methodology demonstrates imaging of cell dynamics and has the potential for measuring cell biomechanical properties, which are important in assessing cell health.

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