

Abstract Submitted
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Adsorption of diatoms at the oil-water interface NILOOFAR FATHOLLAHI, JIAN SHENG, Texas Tech Univ. — Statistically robust experimental observations on 3D trajectory of diatoms approaching an oil-water interface is crucial for understanding sorption mechanisms of active particles, and interfacial rheology with over-arching implications in interfacial dynamics, droplet break and coalescence. Digital Holographic Cinematography is utilized to measure 3-D trajectories of diatoms, *Thalassiosira pseudomona* and *T. weissflogii* and simultaneously track the interface. Experiments are conducted in a 300x100x100mm chamber containing 32 ppt artificial seawater. A stationary pendant drop is created on the tip of a needle located at the center of the chamber. Three oil samples, Louisiana crude, hexadecane, and mineral oil, are used. Diatoms are injected at a height above the drop with a negligible velocity, where Diatom precipitates freely on its excess weight. Holograms of diatom and drop are recorded at 5 fps with a magnification of 1.3X and are streamed in real time allowing for long-term study of sorption onto a slowly aging interface. A novel autofocus algorithm enables us to determine 3D locations within an uncertainty of 0.05 particle diameter. This allows us to perform super-resolution measurement to determine the effects of location and orientation of diatoms on the adsorption rate at the oil-water interface. Funded by GoMRI.

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