Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Sinusoidal Forcing of Interfacial Films[1] FAYAZ RASHEED, ADITYA RAGHUNANDAN, Rensselaer Polytechnic Institute, AMIR HIRSA, Rensselaer Polytech Institute, JUAN LOPEZ, Arizona State University — Fluid transport, in vivo, is accomplished via pumping mechanisms of the heart and lungs, which results in biological fluids being subjected to oscillatory shear. Flow is known to influence biological macromolecules, but predicting the effect of shear is incomplete without also accounting for the influence of complex interfaces ubiquitous throughout the body. Here, we investigated the oscillatory response of the structure of aqueous interfacial films using a cylindrical knife edge viscometer. Vitamin K_1 was used as a model monolayer because its behaviour has been thoroughly quantified and it doesn't show any measurable hysteresis. The monolayer was subjected to sinusoidal forcing under varied conditions of surface concentrations, periodic frequencies, and knife edge amplitudes. Particle Image Velocimetry(PIV) data was collected using Brewster Angle Microscopy(BAM), revealing the influence of oscillatory interfacial shear stress on the monolayer. Insights were gained as to how the velocity profile dampens at specific distances from the knife edge contact depending on the amplitude, frequency, and concentration of Vitamin K_1.

[1]Supported by NNX13AQ22G, National Aeronautics and Space Administration

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Date submitted: 31 Jul 2015 Electronic form version 1.4