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Dispersion of Particles on Fluid-Liquid Interfaces B. DALAL, S. GURUPATHAM, M. HOSSAIN, I. FISCHER, P. SINGH, New Jersey Institute of Technology, D. JOSEPH, University of Minnesota — This talk is concerned with the dispersion of particles on the fluid-liquid interface. In our previous studies we have shown that when small particles, e.g., flour, pollen, etc., come in contact with an air-liquid interface, they disperse in a manner that appears explosive. This is due to the fact that the capillary force pulls particles into the interface causing them to accelerate to a relatively-large velocity. The motion of particles in the direction normal to the interface is inertia dominated, and so they oscillate vertically about the equilibrium position before coming to a stop under viscous drag. This causes a radially-outward lateral flow on the interface that causes nearby particles to move away. In experiments the strength of the lateral flow was measured using tracer particles that were placed on the interface for this purpose. The dispersion on a liquid-liquid interface was relatively weaker than on an air-liquid interface, and occurred over a longer period of time. This partly was a consequence of the fact that particles became separated while sedimenting through the upper liquid and reached the interface over a time interval that lasted for several seconds. The rate of dispersion depended on the size of particles, the particle and liquids densities, the viscosities of the liquids involved, and the contact angle.

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