

1994 MEETING OF THE DIVISION OF FLUID DYNAMICS

20-22 November 1994

Westin Peachtree Plaza (Hosted by Georgia Tech)

Atlanta, GA

ABSTRACT SUBMITTAL FORM

NONLINEAR DYNAMICS OF NON-SPHERICAL LEVITATED DROPS: AN EXPERIMENTAL STUDY. E.H. Trinh, R.G. Holt, and D.B. Thiessen. Jet Propulsion Laboratory, California Institute of Technology.

Earth-based levitation of free liquid droplets in a gas or trapping of gas bubbles in a liquid invariably causes deviation from the ideal spherical geometry because of the force fields required for levitation. The dynamical response of the fluid particles reflects this constraint, and the characteristic oscillatory resonances are different from those of a totally free droplet or bubble. We present results of measurements involving the large amplitude shape oscillations of ultrasonically levitated droplets in a variable intensity, but quasi-spatially uniform electric field and with variable free surface charge. The change in the modal frequencies, the coupling to non-axisymmetric modes, the modal coupling, and the static shape deformation are all areas of interest. The outcome of this study can be used to build a data base against which observations from low gravity-based investigations can be compared. These latter studies combined with numerical modeling would then allow the quantitative evaluation of acoustic and electric field effects on the single fluid particle dynamics that are more characteristic of Earth-based natural phenomena and of industrial processes. [Work supported by NASA]

Abstracts are due on or before 5 August 1994

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