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Dynamics of microbubbles under the effect of ultrasonic pressure waves CHERYN ENGEBRECHT, ALBERTO ALISEDA, Department of Mechanical Engineering. University of Washington — Ultrasound contrast agents are small ($1 - 10\ \mu m$) gas-filled bubbles encapsulated by a lipid bilayer to stop dissolution of the gas in the surrounding liquid. They are used in medical clinical practice to improve the signal to noise ratio of human tissue images with poor quality due to low acoustic impedance mismatch between the tissue of interest and its surroundings. The dynamics of these bubbles are poorly understood and they are typically considered as passive flow tracers. This lack of understanding of the hydrodynamic and acoustically-induced forces on the bubbles impairs the development of more sensitive applications such as targeted drug delivery. We have performed experiments with microbubbles immersed in stagnant and pulsatile flows and characterized their trajectories with and without the application of an ultrasound field. We will describe the competition of hydrodynamic forces (viscous drag, added mass, lift, etc.) and Bjerkens force (ultrasound radiation) in determining the trajectories of this microbubbles in simple geometries that mimic the human circulatory system.

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