

ACOUSTICS2008/3546

Ultrasound and microbubble interaction

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Ultrasound contrast agent (UCA) bubble response to ultrasound (US) is still the subject of several studies, since it determines the power of medical diagnostic imaging modalities. Generally, bubbles are studied using optical or acoustical methods, both having their specific advantages, in an environment that mimic the clinical practice as good as possible (small-diameter capillaries, red blood cells, blood viscosity). Acoustical observations could provide a better insight in the acoustical scattering of bubbles, which determines the final efficacy of contrast-enhanced diagnostic US imaging, and are better suitable to determine the properties of populations of bubbles. Optical observations allow for easier characterization of fewer bubbles and a more detailed characterisation in case where bubbles vibrate non spherically, which is expected for bubbles nearby a wall or red blood cells. In this presentation, we show optical recordings of the various bubble responses with the ultrahigh speed Brandaris-128 camera, and discuss the clinical implications of our findings.