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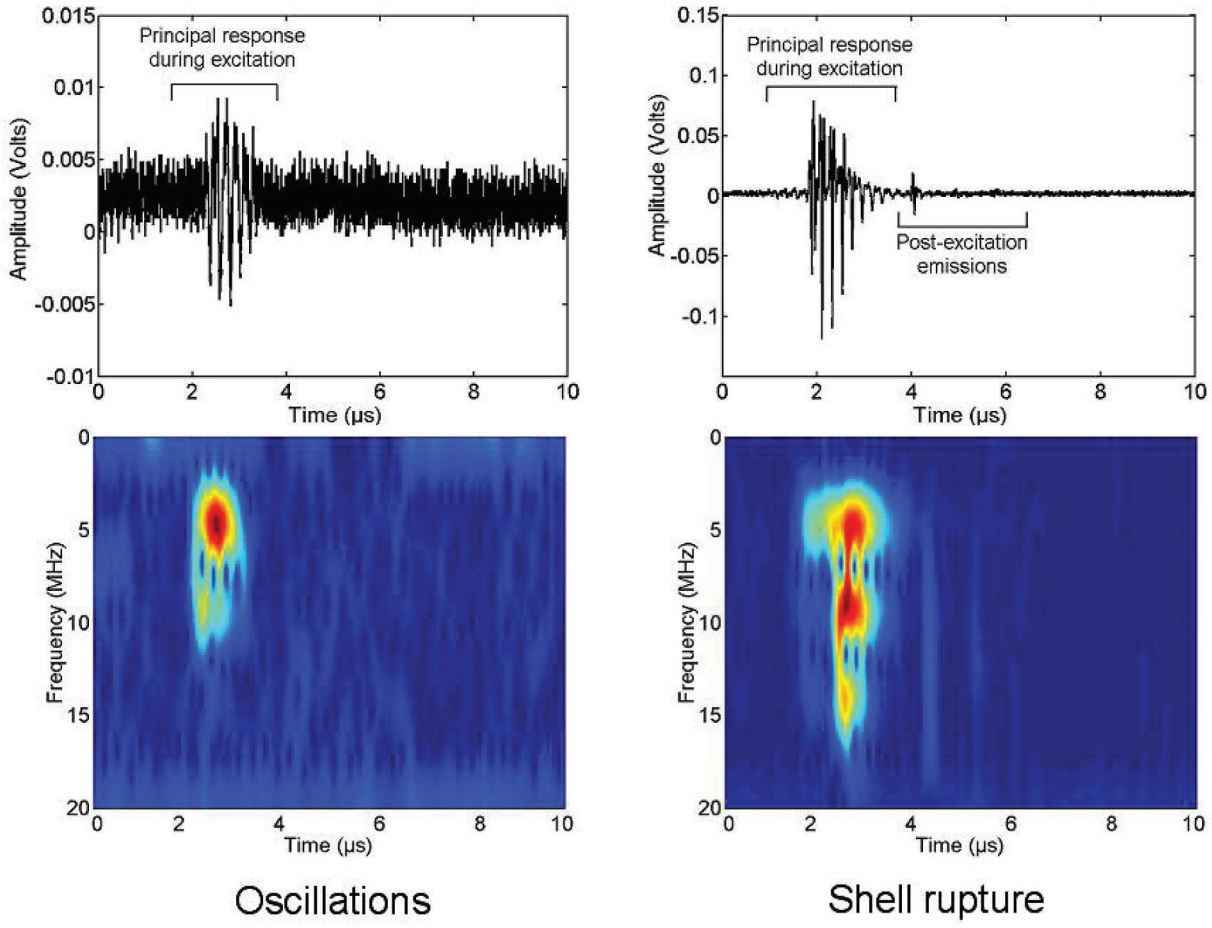

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Ultrasonic Contrast Agent Shell Rupture Detected by Inertial Cavitation and Rebound Signals

Figures show echo waveforms and their time-frequency spectrogram for two single shelled microbubbles. On the left, after the end of the excitation, no acoustic emissions are detected. The microbubble is oscillating. On the right, at around 4.5 μs, a short-duration response is seen and a corresponding broadband signature is observed in the spectrogram. We conclude the shell has ruptured.

Images courtesy of Azzdine Y. Ammi, Laboratoire d'Imagerie Paramétrique, Centre National de la Recherche Scientifique, Paris, France. See accompanying article, A. Y. Ammi, R. O. Cleveland, J. Mamou, G. I. Wang, S. L. Bridal, and W. D. O'Brien, Jr., "Ultrasonic contrast agent shell rupture detected by inertial cavitation and rebound signals," IEEE Trans. Ultrason., Ferroelect., Freq. Contr., vol. 53, no. 1, pp. 126–136, Jan. 2006.