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**Shockwave-Gas bubble Interaction in Complex Configurations** FENFANG LI, MANISH ARORA, CLAUS-DIETER OHL, Division of Physics and Applied Physics, School of Physical and Mathematical Sciences, Nanyang Technological University — Shockwave-gas bubble interaction is relevant in biomedical applications such as shock wave lithotripsy and histotripsy where cell rupture needs to be avoided or is advantageous, as well as in the mining industry for microbubble aerated explosive gels. Here we demonstrate an experimental technique to study this interaction in a well-controlled manner utilizing microfluidics and high-speed photography of up to 2 million frames per second. Micron-size gas bubbles are generated with a continuous wave laser beam modulated with a digital hologram, whereas the shockwave and an expanding cavitation bubble are created with a pulsed laser. Gas bubbles are known to generate fast jets when impacted by shockwaves and we observe jets of 125 m/s and more. Complex interactions are reported for geometric arrangements of up to 6 gas bubbles: cascaded and simultaneous collapse of gas bubbles, back reaction of the gas bubbles on the cavitation bubble, and the deflection of jets for neighbouring bubbles. Besides, we find secondary cavitation within the liquid film below the expanding cavitation bubble, which is likely due to trapped gas exposed to low pressures and high shear, i.e. a regime relevant for cavitation in lubricating films.

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