P-29: Bubble dynamics and sonoluminescence activity in a multi-bubble system

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The connection of microscopic bubble dynamics and sonoluminescence emission is investigated in a multi-bubble system at various frequencies. Particular interest is put on Na* line emission in NaCl solution under Argon atmosphere. We employ high-speed videography, high-resolution color photography, and PMT light emission and spectroscopic measurements. In the sonoluminescence patterns, a strong dependence is seen for variation of frequency, gas content, and driving amplitude. With respect to the properties of the observable bubbles, numbers, sizes and translation velocities are influenced by parameter changes, but, on the other hand, the bubble dynamics itself is not changing much: frequent bubble collisions and shape instabilities are observed for all situations. Therefore, one preliminary conjecture is that observed threshold behaviors, e.g. with respect to light emission or sonochemical activity, might rather be an effect emerging from bubble number density than from individual bubble dynamics changes.