

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Interaction of Cavitation Bubbles on Surfaces MANISH ARORA, NICOLAS BREMOND, STEPHAN DAMMER, DETLEF LOHSE, Physics of Fluids, Faculty of Science and Technology, University of Twente, The Netherlands — Patterned structures on solid surfaces can be used as controlled nucleation sites for cavitation. Etched micro-pits on hydrophobic solid surfaces trap small amounts of gas during immersion in water, which—when lowering the pressure—serve as bubble nucleus. Using specifically patterned surfaces, the dynamics of a few bubbles with controlled distances is investigated. The temporal evolution of the cavitating bubbles is visualized stroboscopically and with high speed imaging. When the inter-bubble distance is sufficiently small, the bubbles merge through a series of fascinating intermediate 3d shapes. Moreover, bubbles on the edge of the pattern ‘shield’ the bubbles inside, thus delaying the collapse of the interior bubbles. The results are reproduced with the help of axis-symmetric boundary integral simulations.

Manish Arora
Physics of Fluids, Faculty of Science and Technology, University of Twente, The Netherlands

Date submitted: 09 Aug 2005

Electronic form version 1.4