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Shock wave induced shedding of cavitation clouds HARISH GANESH, SIMO MAKIHARJU, STEVEN CECCIO, University of Michigan — Mechanisms responsible for periodic shedding of vapor clouds from partial cavities forming on a wedge are explored using time resolved X-ray densitometry. Time resolved 2-D void fraction flow field measurements of such partial cavities are obtained to identify the mechanisms of transition from closed partial cavities to open cavities exhibiting periodic shedding of vapor clouds or large gas pockets break off. From the void fraction field measurements, presence of an advancing bubbly shock front responsible for periodic shedding is identified as a primary cause of shedding. The void fraction measurements also reveal the presence of a reentrant flow at the cavity closure that produces intermittent shedding of smaller scale cavities at slightly higher cavitation numbers than periodically shedding cavities. A discussion on the observed occurrence and properties of the bubbly shock wave, and its role in causing periodic shedding is presented based on the one-dimensional model of shock propagation in bubbly mixtures. The observed cavity shape and its dependence with cavitation number is also compared with analytically predicted cavity shape using free streamline theory.

Harish Ganesh
University of Michigan

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