Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Three-dimensional bubble mechanics in a corner subject to an acoustic wave EOIN O'BRIEN, MEHDI MAHMUD, QIANXI WANG, University of Birmingham — The development of cavitation bubbles in a corner subject to an acoustic wave has important applications in ultrasonic cleaning, and cavitation damage. Previous developments have been made on the effects of an acoustic wave on a microbubble near a rigid wall, (K. Manmi 2014), highlighting the effects of the high intensity ultrasound on the bubble's timespan, jet direction and overall shape of the bubble surface, regarding the initial radius of the bubble and the amplitude of the acoustic wave. Furthermore, numerical simulations have been made to accurately simulate the evolution of a cavitation bubble in a corner created by the intersection of two rigid walls for differing angles. In this presentation, I introduce the mathematical model used for a bubble in a corner subject to an acoustic wave along with the boundary integral method used to numerically model the development of the bubble surface with time. From this, numerical results are presented to highlight the effects of the corner and the acoustic wave for a range of angles, acoustic wave amplitude, and initial bubble radius. In doing so, the jet direction upon collapse can be found, along with the bubble migration towards the corner over time.

Eoin O'Brien
University of Birmingham

Date submitted: 01 Aug 2019 Electronic form version 1.4