FM10L_11909

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Void Collapse and Jet Formation: The Impact of a Disk on a Water Surface.

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The formation and collapse of the void created by the impact of a disk onto a water surface is investigated experimentally and numerically. The experiments are performed using a linear motor to precisely control the disk velocity; the simulation is based on a boundary integral formulation. The numerical results for the void shape are found to be in excellent agreement with the experimental observations. The cavity closes by the radial convergence of the liquid onto the symmetry axis. The resulting impact gives rise to two jets of water, one shooting up straight into the air, and one down piercing the void enclosed by the collapse. Both experiment and simulation show that the depth of the point where the cavity closes divided by the disk radius is proportional to the square root of the Froude number.

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