

Physics of Drop Formation in Drop on Demand Inkjet Printing

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Abstract:

Droplets with a well-controlled and narrow size distribution are required in many industrial and medical applications. In this work we study droplet formation from a piezo inkjet print head by using ultra high-speed imaging at 10 million frames per second. Also a second technique was applied, in which a single flash of 5ns is used to illuminate the drop formation. The acquired recordings are used to calculate the flow rate and velocity development inside the droplet. The result could then be compared with a 1 dimensional model based on the lubrication approximation. In the model the equations are translated into a second order accurate scheme where the pinch-off singularity is prevented by adding a finite regularisation film.