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Acoustic measurement of bubble size and position in a piezo driven inkjet printhead ARJAN VAN DER BOS, ROGER JEURISSEN, University of Twente, JOS DE JONG, Océ Technologies B.V., RICHARD STEVENS, MICHEL VERSLUIS, University of Twente, HANS REINTEN, MARC VAN DEN BERG, HERMAN WIJSHOFF, Océ Technologies B.V., DETLEF LOHSE, University of Twente, OCÉ TECHNOLOGIES B.V. COLLABORATION — A bubble can be entrained in the ink channel of a piezo-driven inkjet printhead, where it grows by rectified diffusion. If large enough, the bubble counteracts the pressure buildup at the nozzle, resulting in nozzle failure. Here an acoustic sizing method for the volume and position of the bubble is presented. The bubble response is detected by the piezo actuator itself, operating in a sensor mode. The method used to determine the volume and position of the bubble is based on a linear model in which the interaction between the bubble and the channel are included. This model predicts the acoustic signal for a given position and volume of the bubble. The inverse problem is to infer the position and volume of the bubble from the measured acoustic signal. By solving it, we can thus acoustically measure size and position of the bubble. The validity of the presented method is supported by time-resolved optical observations of the dynamics of the bubble within an optically accessible ink-jet channel.

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