

Abstract Submitted  
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**Generation of micron-sized bubbles at the entrance region of PDMS microchannels** JOSE MANUEL GORDILLO, Grupo de Mecanica de Fluidos, Universidad de Sevilla, Spain, WIM VAN HOEVE, DETLEF LOHSE, Physics of Fluids, Twente University, The Netherlands, ELENA DE CASTRO-HERNÁNDEZ, Grupo de Mecanica de Fluidos, Universidad de Sevilla, Spain — Here we present a new regime of operation of PDMS-based flow focusing microfluidic devices. We show that bubbles with diameters below one tenth the channel width, which we fix here to  $w = 50 \mu\text{m}$ , can be produced in low viscosity liquids thanks to the strong pressure gradient existing at the entrance region of the channel. Our theory, which is in good agreement with experiments, predicts that bubble size can be expressed as  $d_b/w \propto (Q_g/Q_l)^{5/12}$ , where  $Q_g$  and  $Q_l$  indicate, respectively, the gas and liquid flow rates.

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