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Flow regime and dynamic critical pressure of droplet entering confined microchannel ZHIFENG ZHANG, Mechanical Engineering, Washington State University, 14204 NE Salmon Creek Ave, Vancouver, Washington 98686, USA, JIE XU, Department of Mechanical & Industrial Engineering, University of Illinois at Chicago, Chicago, Illinois 60607, XIAOLIN CHEN, Mechanical Engineering, Washington State University, 14204 NE Salmon Creek Ave, Vancouver, Washington 98686, USA, CAE LAB TEAM, XU GROUP: MICROFLUIDICS LAB TEAM — Droplet entering a microchannel contraction is a phenomenon widely seen in many applications, such as two phase separation, droplet microfluidics, size-based cancer cell detection, and micro combustors. Better understanding of the droplet flow regime as well as the droplet deformation pattern is crucial to device design in aforementioned applications. In present numerical study, we explore the transient behavior of droplet being squeezed into a micro-contraction and we report different flow regimes observed according to the blockage status of the droplet in the entrance of the contraction. We then quantify the relation between droplet deformation, back pressure and the flow velocity in the channel. In the end, we explore the effects of channel geometry by comparing the results in three different shapes of channels (circular square and rectangular).

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