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Microfluidic bubble trains in non-Newtonian fluids MATTHEW SULLIVAN, Division of Engineering and Applied Sciences, Harvard University / Schlumberger-Doll Research, KARINA MOORE, Norfolk State University, HOWARD STONE, Division of Engineering and Applied Sciences, Harvard University — We present studies of bubble formation and propagation in non-Newtonian fluids using a microfluidic flow-focusing device. Under certain conditions, monodisperse bubble trains can be formed. The bubble size and shape at formation are measured as a function of fluid flow rate and gas pressure and compared to bubble generation in a Newtonian fluid. We also observe two instabilities in non-Newtonian bubble propagationdrifting toward the channel wall and drifting towards neighboring bubbles in the bubble train even at large initial bubble separations. This behavior is in contrast to a Newtonian fluid where bubbles occupy a stable position along the channel centerline and maintain their initial separation.

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