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Optical characteristics and nonlinear dynamics of a pinned-contact double droplet system JOSEPH OLLES, AMIR HIRSA, Rensselaer Polytechnic Institute, MICHAEL VOGEL, Voorhees, NJ — Through the use of an oscillating double droplet system (DDS), an adaptive varifocal fluidic lens is created. Pinning the gas/liquid contact lines of the DDS eliminates viscous losses from moving contact lines and aids in simplifying the geometric parameter space. The use of millimeter scale diameters allows capillary effects to form stable droplets with spherical interfaces. We present a range of dependent parameters for the DDS as a fluidic lens which is made to oscillate by a sinusoidal pressure in millisecond cycles and various amplitudes. The lens is characterized through the following optical parameters throughout a cycle: sphericity, radius of curvature, focal length, and field stop. A non-linearity in the DDS's resonant frequency is identified at various volumes; slight changes in the amplitude of the driving pressure produces a substantial shift in the resonant frequency of the system.

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