Using a Double Droplet System to Create a Fast-Focusing Liquid Lens

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Liquids possess potential for use as adaptive lenses; lenses that can change their optical properties. The Double Droplet System (DDS) provides a unique type of liquid lens, one that rapidly oscillates back and forth to scan a large range of object focal distances faster than any other lens could for fast-focusing. In this project, a camera system was designed to test and demonstrate this concept. A DDS lens tank was built and used with a camera CCD to produce images. An oscillating chamber utilizing magnetic coils driven by a micro-controller was created to actuate the lens and allow it to regularly oscillate. A custom control scheme allowed for a range of variation in the oscillations of the lens. The system was tested in different environments that demonstrate its optical capability, and made portable for live demonstration.

Awards Won: