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**Buoyancy Driven Mixing By Microwave Volumetric Energy Deposition** ADAM J. WACHTOR, VERONIKA MOCKO, FARZANEH F. JEBRAIL, MALCOLM J. ANDREWS, ROBERT A. GORE, Los Alamos National Laboratory — An investigation of buoyancy driven mixing of two miscible fluids due to volumetric energy deposition by microwaves is presented. The experimental setup is initially Rayleigh-Taylor stable and consists of a light, non-polar fluid at rest atop a heavier, polar fluid. Microwaves preferentially heat the polar fluid, and its density decreases due to thermal expansion. As microwave heating continues, the density of the lower fluid eventually becomes less than that of the upper fluid, thus, the system passes through the neutral stability point and becomes Rayleigh-Taylor unstable, causing buoyancy driven mixing. The evolution of the experimental design from proof-of-concept, to a customized facility designed for enhanced data collection is discussed. In addition, the fluid selection criteria found necessary for experimental success is presented. Single fluid heating experiments were performed to facilitate model development used to predict the neutral stability point and onset of buoyancy driven mixing. Results from the two-fluid mixing experiments demonstrate the capability of this novel Rayleigh-Taylor driven experiment. Particular interest is paid to the onset of buoyancy driven mixing, and atypical aspects of the experiment in the context of typical Rayleigh-Taylor driven mixing.

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