

Abstract Submitted  
for the DFD19 Meeting of  
The American Physical Society

**Marangoni Instability and Interfacial Turbulence of a Water Drop at an Oil/Alcohol Interface**<sup>1</sup> SAMI YAMANIDOUZISORKHABI, GARETH H. MCKINLEY, IRMGARD BISCHOFBERGER, MIT — Water and ethanol are fully miscible, while anise oil and ethanol are partially miscible and anise oil and water are immiscible. Mixing of all three liquids; however, result in an equilibrium state emulsion of anise microdroplets in water/ethanol solution. Here, we study the mixing of a water drop at the interface of anise oil and ethanol until the equilibrium emulsion state is achieved. We use a combination of regular imaging and Schlieren imaging to visualize the mixing phenomenon. This mixing involves two processes: (i) introduction of a water drop at the anise oil/ethanol interface and formation of a vortex ring due to natural convection caused by exothermic mixing of water and ethanol, (ii) growth of the vortex ring at the interface due to Marangoni forces until the equilibrium state is achieved. We show that the inhomogeneities at the anise oil/ethanol interface apply non-uniform Marangoni forces on the vortex ring resulting in its deformation and a non-uniform distribution of the final mixing product, i.e., the equilibrium state emulsion, at the interface.

<sup>1</sup>We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada (NSERC). Cette recherche a été financée par le Conseil de recherches en sciences naturelles et en génie du Canada (CRSNG).

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Date submitted: 01 Aug 2019

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