Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Simultaneous Temperature and Velocity Field Measurements of Liquid Hydrocarbons by Dual-luminescent Imaging and Particle Tracking Velocimetry in a Side Heated/Cooled Cavity.[1] TATSUNORI HAYASHI, University of Notre Dame, HAMED FARMAHINI FARAHANI, ALI S. RANGWALA, Worcester Polytechnic Institute, HIROTAKA SAKAUE, University of Notre Dame, ICE MELTING INDUCED BY FLOWS IN AN ADJACENT IMMISCIBLE LIQUID LAYER COLLABORATION[2] — Arctic oil spills are detrimental as they could cause extensive ice melting in addition to the overall environmental pollutions. Floating oil slicks among ice floes absorb ambient energy and transfer that energy to the ice to aggravate melting in thaw season. However, no studies have revealed how oil-ice interaction impacts ice melting. This research investigates the heat transfer pathways from oil slicks to the ice. Dual-luminescent imaging and particle tracking velocimetry (PTV) in a side heated/cooled cavity is performed for temperature and velocity measurements of liquid hydrocarbons, respectively. Dual-luminescent images and images of the seeding particles in PTV captured spatiotemporal temperature distribution and velocity field of oil in the cavity, respectively. The results show the convective field is directly coupled with the temperature field induced by temperature difference in the liquid. Successful implementation of the two measuring techniques together is a step toward analyzing heat transfer pathways in a liquid fuel adjacent to an ice body.

[1]Award Abstract 1938976 Collaborative Research: Ice Melting Induced by Flows in an Adjacent Immiscible Liquid Layer
[2]Collaborative research with University of Notre Dame and Worcester

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Date submitted: 02 Aug 2020 Electronic form version 1.4