



Master Arbeit/ Thesis: Measuring Droplet Impingement Heat Transfer (Posted on 13.09.22)

Heat Transfer occurs in the event of non-isothermal droplet impact on a substrate. The heat transfer rate is strongly dependent on the substrate and droplet temperatures. The impingement heat transfer is particularly important in aircraft icing, spray cooling and additive manufacturing. However, due to the shorter residence times and deforming/varying contact areas, the experimental data is limited. ISM is planning to use micro thermocouples to measure rate of change of temperature and use the semi-infinite body theory to measure the heat flux. The measured heat flux data will be used to find the empirical constants for the analytical model in Ref.1. With the model constants known, the method will be used to determine the unknown droplet temperature.

Your Work:

- Design and construction of a Piezo droplet generator (Ref. 2)
- Calibration of the droplet generator system
- Obtaining experimental data
- Post processing and analysis of the data
- Extension to SLD droplet temperature measurement

Requirements

- Good understanding of Heat Transfer
- Familiar with Matlab and/or other programming languages
- Interest in image processing
- Experience with LabView/Arduino (advantageous but not necessary)

Are you **interested**? For more information, please contact.

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References

1. Roisman, I. V., "Fast forced liquid film spreading on a substrate: flow, heat transfer and phase transition", vol. 656, pp. 189-204, JFM 2010.
2. Harris, D. M., "A low-cost, precise piezoelectric droplet-on-demand generator", 56-83, Exp. Fluids 2015