Experiment 2: Boiling Heat Transfer

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Objective: Characterize the boiling curve of platinum wire in water.

- Obtain approximately 2 data points in the free convection boiling regime, 5 data points in isolated bubble nucleate boiling regime and 5 data points in jets and columns boiling regime that are equally spaced on the boiling curve.
- Obtain 2 data points upscale in the film-boiling regime.
- Obtain approximately 12 point resolution downscale, starting in film boiling.

Informal Report: Draw the obtained boiling curve, along with predicted values for critical heat flux and nucleate boiling.

Discuss the following.

- Does boiling begin when the temperature of the platinum wire slightly exceeds the water temperature at saturation?
- I am worried that temperature measurements of the platinum wire are unacceptable because of possible heat loss to the wire supports. Can you assure that this is not a factor? Otherwise, can you estimate the heat loss and incorporate it into your results?
- Does boiling enhance heat transfer relative to single-phase heat transfer?
- Can you estimate critical heat flux?
- Using a heat transfer correlation, can you estimate the heat transfer coefficient at the upper-end of the natural convection regime?
- How would you set up an experiment that would allow you to draw the line between the point of critical heat flux and the Leidenfrost point?

Attach commented data acquisition codes as appendices.