Using a force sensor to measure vaporization of liquid nitrogen*

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November 26, 2015
Version 2015-3

The philosophy of the present task is derived from Experiment 1.7 except that the voprization will be measured using a force sensor (instead of a mass balance). See Fig. 1. Use the provided software (Logger Lite) to connect to the force sensor through the provided interface. Record the mass loss of liquid nitrogen as a function of time. Then systematically supply energy to the liquid using a heating filament. Measure the power delivered to the heater and the duration of heating. Switch the heater off, and allow the nitrogen to re-establish its natural background vaporization rate. Plot the mass loss and use it to determine the latent heat of vaporization. See the manual for experiment 1.7 if you need more help.

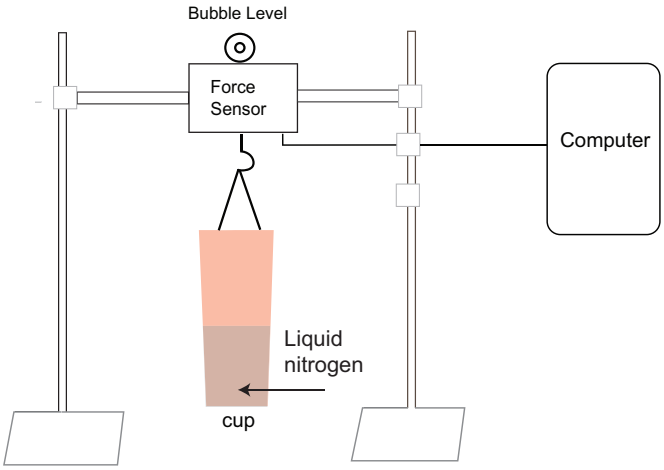

Figure 1: Arrangement for using a force sensor.

You will be assessed on the basis of (a) setting up the experiment apparatus and software, (b) performing the experiment and collecting data, (c) finding the rates of loss of liquid nitrogen during various parts of the experiment, (d) inferring the mass loss Δm of liquid nitrogen due to electric heating and finally (e) inferring the value of latent heat of vaporization of liquid nitrogen. All of this, of course, should follow best practices we've learnt about inside the lab.