

Plasma Experiment

In this experiment a plasma is created with a high-voltage discharge in a tube containing low-pressure nitrogen. The pressure used is approximately $50 - 100\mu$, where 1μ is .001 mm Hg. A thermocouple gauge is used to measure the pressure.

A mechanical pump is used to obtain the necessary vacuum. Then nitrogen is introduced into the system, and the high voltage is turned on.

A probe in the tube wall is used to study the plasma. By measuring the relation between the probe current and voltage, the effective electron temperature may be determined.

It is important for the experimenter to understand the physical processes behind the experimental method for determining the temperature. The longer write-up and the other hand-outs contain useful information on this.

IMPORTANT: Do not start work on the experiment before going over the procedures with the instructor. Experimenters should wear safety glasses whenever there is vacuum in the system. The protective plexiglas box must be in place whenever the high voltage is on.

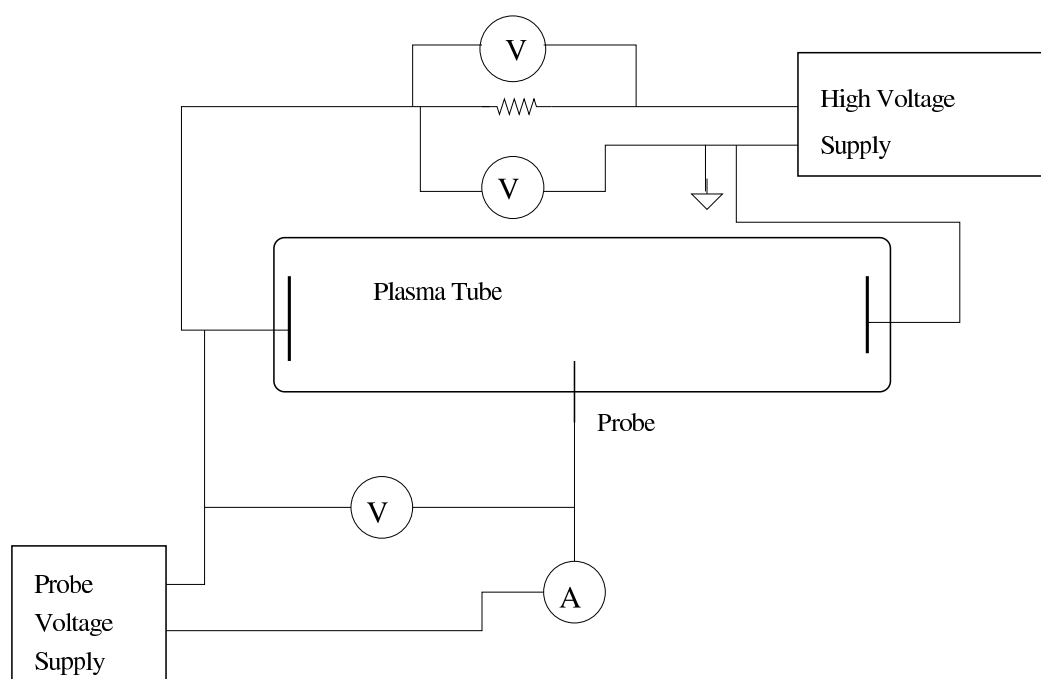


Figure 1: Block diagram of the plasma experiment. Note that both sides of the probe voltage supply are above ground.