

PHYSICS 180E, WINTER 2025

HOMEWORK 3

(DUE WEDNESDAY FEB. 5 BY MIDNIGHT ON GRADESCOPE)

1. Write a paragraph for each question below giving physical explanations. This can be a rough draft of an analysis/discussion section for your lab report.
 - (a) On the same plot, show your measured Paschen curves for Nitrogen and Argon (and Helium if available). What is the ordering of the gases with respect to the minimum breakdown voltages? Does this order make sense? Why or why not? Can you make use of the result in problem 1 from Homework 2 (minimum breakdown voltage calculation) to make your argument?
 - (b) Obtain a fit for Paschen's law with parameters A , B , and γ_{SE} for the gasses you studied. Do the values obtained from these fits make sense in terms of physical parameters?
2. With your lab group, write an experimental plan that you will execute for Lab 2 beginning in Week 5. The plan should outline the measurements you wish to take and the physical motivation for each setup. Make sure that your plan is feasible with respect to time and equipment. Submit your plan as a group on Gradescope prior to your lab session.