Polarization Rotation DC PreLab
Rochester Institute of Technology

PHYS-316 Advanced Lab*

January 11, 2022

1. Write the equation representing Malus' Law. Consider a simple optical system consisting of a light source, a polarizer, an analyzer polarizer, and a detector. Sketch a graph of the intensity you expect to measure at the detector as a function of the angle between the polarizer and analyzer.

2. The spec sheet for this equipment gives the following nominal parameters for the solenoid:

length	15.0 cm
turns per layer	140
number of layers	10
wire size	18 AWG

   (a) Calculate the magnetic field you would expect inside an "infinite" solenoid if it had the same turns per unit length as the real one used in this lab, and carried a current of 3 A.

   (b) Calculate the approximate total length of wire used to wind the solenoid, and from a wire reference table find the total resistance of the coil. How does your approximate calculation compare to the 2.5 Ω spec? L. Barton measured the inner diameter of the solenoid to be 17.4 mm, and the outer diameter to be 36.6 mm. Use an average diameter for this calculation.

*Prepared by L. Barton and A. McGowan