

Homework #4 for Physics 371

Due 4pm Friday February 19

Griffiths, Problems 2.5, 2.6, and 2.21

4) Consider a particle of charge q and mass m moving around a one-dimensional ring of circumference L , described by the wavefunction

$$\psi_n(x) = \sqrt{\frac{1}{L}} \exp(ik_n x).$$

- a) Calculate the probability current, and the electrical current circulating in the ring.
- b) Compare the result for the electrical current found in part (a) to what you would expect for a classical particle with the same velocity.