Homework 1  
Physics 309, Spring 2016  
Due date: Jan 29, 2016

Problems:

1. Derive the path length difference in the Michelson-Morley interferometer shown below in the rest frame of the ether. You should achieve the same equations as equations (2.3) and (2.4) in the textbook en route to the same solution shown in lecture,

\[ c\Delta T_\parallel - c\Delta T_\perp = 2 \left( \frac{L_1 + L_2}{1 - \frac{v^2}{c^2}} - \frac{L_1 + L_2}{\sqrt{1 - \frac{v^2}{c^2}}} \right). \]  

2. Thornton and Rex, problem 2.6

3. (a) Thornton and Rex, problem 2.13; (b) Thornton and Rex, problem 2.14

4. Thornton and Rex, problem 2.30

5. Thornton and Rex, problem 2.38

Grading rubric:

- You are encouraged to show work and explain it in your own words. Partial credit will be assigned in proportion to the correct principle applications.

- Your work must be legible. Illegible (parts of) solutions will not be read, and points may be deducted.

- One point will be deducted for missing or incorrect units on (numerical) solutions.

- For plots one point will be deducted for missing axis and tick labels. Another point will be deducted for missing or incorrect units if applicable.

- “An Aggie does not lie, cheat or steal, or tolerate those who do.” If academic dishonesty is discovered, all associated individuals will receive a zero for this assignment.