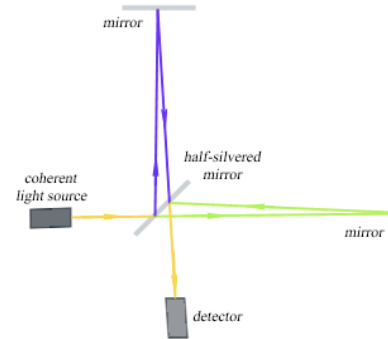


Homework #2 – Due Friday October 21

1. Giancoli, Chapter 3, Problem 83 (time for round trip of total distance D on river, (a) parallel and (b) perpendicular to flow).

2. (a) Suppose that in the Michelson interferometer experiment pictured at right, the earth is moving in the horizontal direction at $v = 30$ km/s, that light is moving at speed $c = 300,000$ km/s, and that each path from the half-silvered mirror to the mirror and back has length D . Apply the results of problem 1 to calculate the lengths of time for the light to follow the horizontal path and the vertical path.



(b) The 1887 Michelson-Morley experiment used this experimental setup to try to measure this difference in the length of time to follow these paths. The experiment had the sensitivity to detect a difference $1/40$ of the expected one, but it detected no difference. This could be explained if the apparatus was contracted by a factor f in the direction of motion, called the Lorentz-Fitzgerald contraction. Find f .

3. Giancoli, Chapter 4, Problem 72 (bicyclist on hill with air resistance).

4. Giancoli, Chapter 5, Problem 40 (roller coaster problem).

5. Giancoli, Chapter 5, Problem 66 (raindrop drag problem).

6. Giancoli, Chapter 5, Problem 68 (sky diver drag problem).