Experiment 2, Speed of light

Part1: Speed of light in an optical fiber.

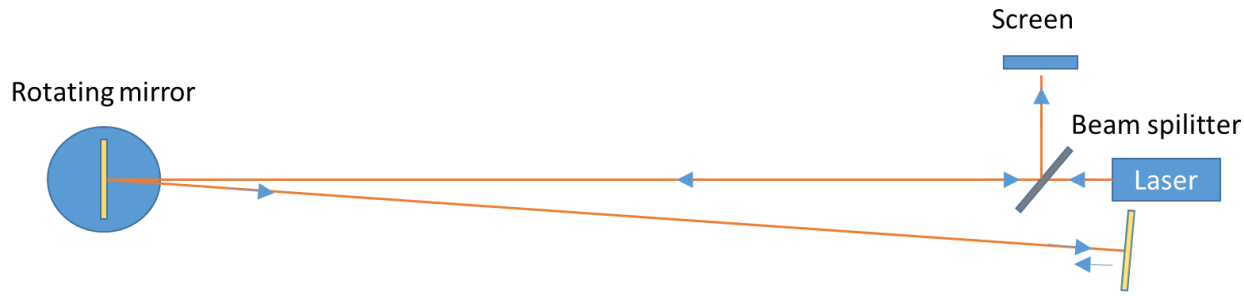
In the first part of the experiment you will measure speed of light propagating in an optical fiber. You will use infrared laser with two different wavelength at 1.33 and 1.55 um wavelength. See the experimental setup.

The laser is invisible. Do not operate the laser when the fiber is not connected.

1. Connect one end of the short fiber optic cable to the laser source and the other end to the IR detector.
2. Modulate the laser source at 2 kHz.
3. Measure the time delay between the laser modulation signal and detector signal.
4. Turn off the laser first.
5. Disconnect the short fiber and use the long fiber optic cable (8800 m long).
6. Measure the time delay between the modulation signal and detector signal.
7. Calculate the speed of light in the fiber.
8. Estimate the effective index of refraction of the fiber.

Part 2: Speed of light in the free space

In the second part of the experiment you will measure the speed of light propagating in the free space. You will use a laser and a rotating mirror. Due to the time delay, the reflected light will be slightly shifted from the initial position. From this shift estimate the speed of light.



When you rotate the mirror always use the protection cover .