## INTRODUCTION

The "speed of light" in free space, commonly referred to as $c$, is a critical constant in the study of modern physics. An example is the study of time dilation and length contraction due to special relativity. The fact that the light has a constant speed goes back to 1837, when James Clerk Maxwell showed the speed of light in different media depends only on the electric and magnetic properties of matter. This constant was fundamental in the Michelson-Morley experiment that disproved the existence of the luminiferous ether.

Galileo first sought to measure the speed of light. His method was a common-sense approach, take two covered lanterns to hilltops at point A and B, uncover A then uncover B when the observer sees the light from A. Galileo expected to be able to measure the difference in the times and determine the speed of light, but he found it was too great to measure. However, he determined longer distances would provide more accurate calculations. Foucault's method is an improvement and can be used to measure the speed of light.

The idea behind this method is to pass a laser through a series of lenses to produce a light source at a measurable position. The light then travels to a rotating mirror, out to a reflection point, and back through the mirror to end near the initial light source. It is believed that the difference between final and initial positions of the light source as well as angular velocity and distance traveled can be used to calculate the speed of light.
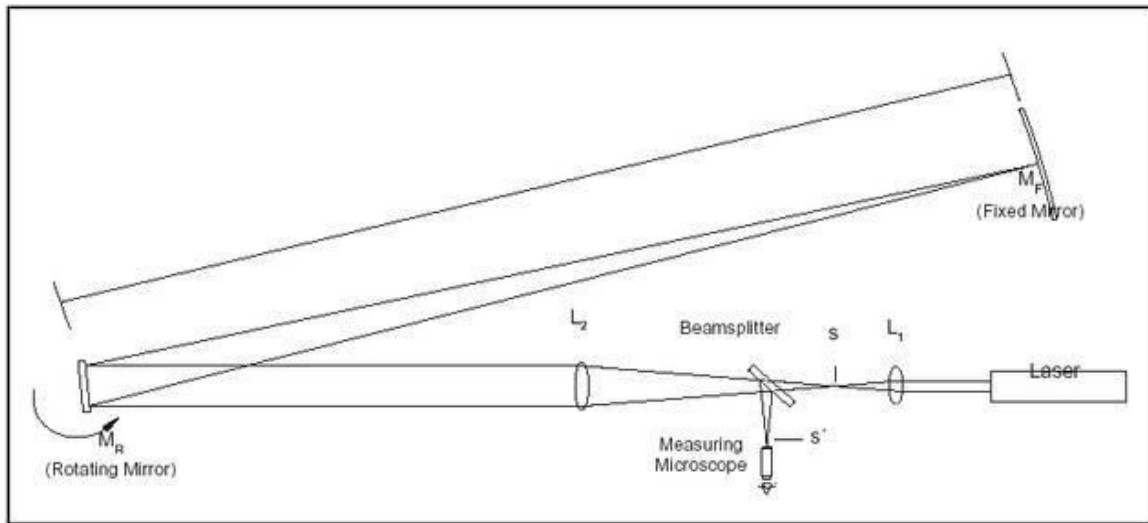


FIGURE 1: Foucault's Method