

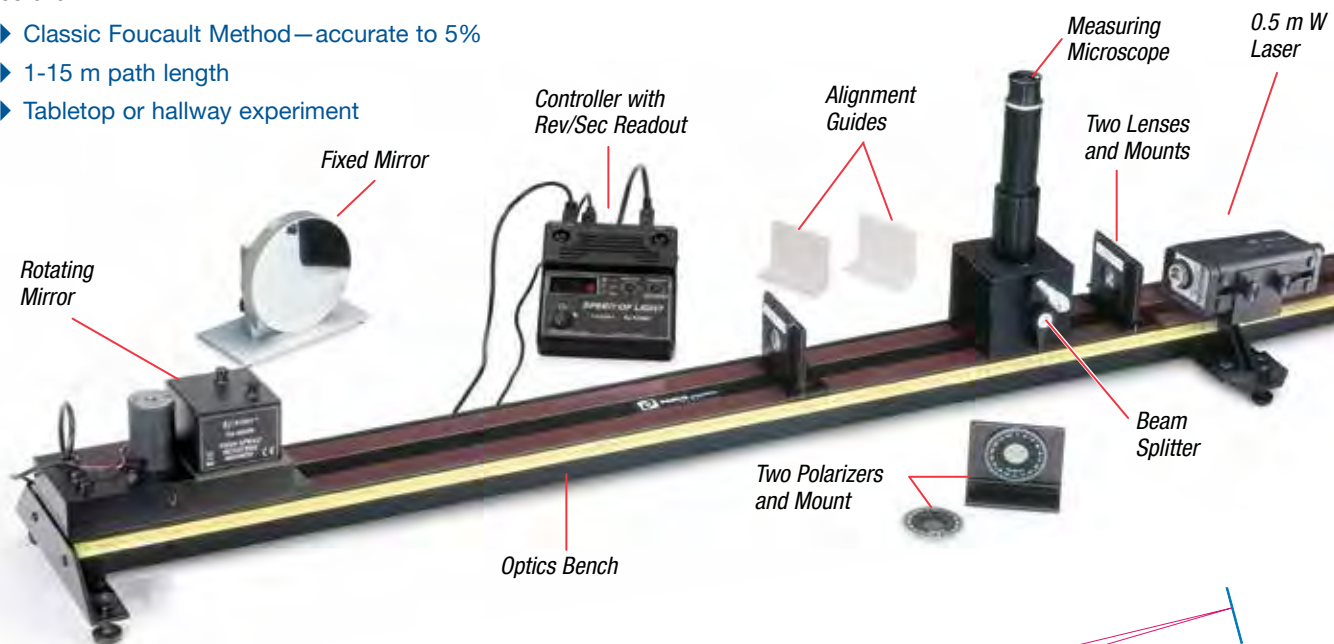
# Speed of Light

## Complete Speed of Light Apparatus

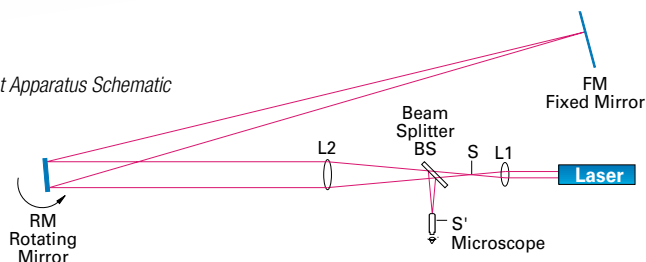
OS-9261B

- ▶ Classic Foucault Method—accurate to 5%
- ▶ 1-15 m path length
- ▶ Tabletop or hallway experiment

CLASS II LASER PRODUCT  
LASER RADIATION – DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS



Speed of Light Apparatus Schematic



### How It Works— The Foucault Method

1. The first observation is made when the rotating mirror is not rotating. Light from a He-Ne laser is reflected from the rotating mirror and focused onto the fixed mirror. The fixed mirror reflects the image back onto the rotating mirror, which in turn reflects the light back through the lenses to reform the image, where it can be observed with the microscope.
2. The second observation is made when the rotating mirror is rotating. Since it takes a finite amount of time for the light to traverse the distance between the fixed and rotating mirrors, the rotating mirror is in a slightly different position when the light returns after reflecting off the fixed mirror. This produces a displacement, which can be measured with the microscope.
3. The displacement between the first and second observations is proportional to the transit time of the light to the angular velocity of the rotating mirror. With a very straightforward calculation, the speed of light can be calculated.

### OS-9261B includes

- 1 m Optics Bench
- Laser Alignment Bench
- Mini Laser with Bracket
- Double Convex Lens, 48 mm F.L.
- Plano Convex Lens, 252 mm F.L.
- Calibrated Polarizer
- Component Carrier

### High Speed Rotating Mirror with Controller

OS-9263B



#### Order Information

High Speed Rotating Mirror with Controller..... OS-9263B

#### Order Information

Complete Speed of Light Apparatus.....	OS-9261B	
<i>Parts available separately:</i>		
Laser Alignment Bench.....	OS-9172	p. 299
Mini Laser with Bracket.....	OS-8514	p. 299
Speed of Light Experiment.....	EX-9932A	p. 381

## Speed of Light

EX-9932A

### Concepts:

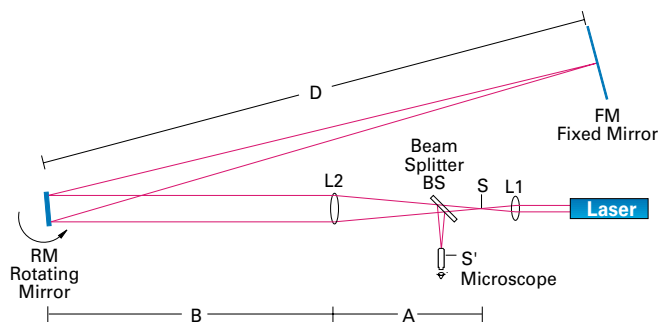
- ▶ Determine the Speed of Light in Air
- ▶ Recreate Foucault's Historical Experiment

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The Speed of Light Experiment uses laser light and a high-speed rotating mirror to determine this fundamental constant using the Foucault method.

Laser light passes through a series of lenses to produce an image of the light source at a measured position. The light is then directed to a rotating mirror, which reflects the light to a fixed mirror at a known distance from the rotating mirror. The laser light is reflected back through its original path and a new image is formed at a slightly different position. The difference between final/initial positions, angular velocity of the rotating mirror, and distance traveled by the light are then used to calculate the speed of light in air.



### PASCO Advantage

PASCO's Speed of Light Experiment allows students to experimentally measure the speed of light within 5% of the accepted value. In addition, the experiment can be performed on a desktop or in a hallway.

- Complete Speed of Light Apparatus
- Speed of Light Experiment Manual

OS-9261B

### To Download This Experiment

Search for EX-9932A at [www.pasco.com](http://www.pasco.com)

### Order Information

Speed of Light.....EX-9932A