Title

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Date

1. Purpose and Hypothesis

The purpose of the experiment is *blah blah blah*.

2. Materials

- Thingamajig 1
- Thingamajig 2

3. Procedures

1. Tingaling 1
    - Mini Tingaling 1
    - Mini Tingaling 2
2. Tingaling 2

4. Results

Table 1 contains the measured properties of the short fiber optic cable. l is the length of that cable, and m is the mass of that cable.

Table 1. Short Fiber Optic Cable Properties

Property	Measurement
l	148.8 ± 0.2 mm
m	0.57 ± 0.01 g

Table 2 contains the main measurements made for the various colors of light and long fiber optic cables used. λ is the peak wavelength output by the LED used. M is the mass of the long fiber optic cable used. t is the travel time for the light pulse to pass through the long fiber optic cable.

Table 2. Main Measurements
Note: UTD means "unable to detect"

Trial	Color	λ (nm)	M (g)	t (ns)
1	Red	645	75.10 ± 0.01	99.85 ± 1.53
2	Green	522	75.10 ± 0.01	UTD through short cable
3	Blue	470	75.10 ± 0.01	UTD through short cable
4	Infrared	940	75.10 ± 0.01	UTD through long cable
5	Infrared	940	37.08 ± 0.01	UTD through long cable
6	Infrared	940	3.75 ± 0.01	UTD clearly through long cable
7	Infrared	940	1.87 ± 0.01	UTD clearly through long cable

5. Uncertainty and Equations

The length of the short cable (l) was measured using a caliper. It had a labeled uncertainty of 0.2 mm, so that was used as the uncertainty. The masses (m and M) were measured using an electronic balance that reported values to within 0.01 g, so that was used as the uncertainty.

The material the fiber optic cable is made of has an index of refraction (n) of 1.49, according to the datasheet. Thus, light slows down when traveling in the cable compared to the speed of light in a vacuum (c, accepted value of 3.00×10^8 m/s). Equation 1 can be used to calculate the speed of light in the cable (v).

$$v = \frac{c}{n} \tag{1}$$

The length of the long fiber optic cable (L) was determined indirectly based on its mass (M) and the linear density of that type of cable (μ). The linear density can be calculated using equation 2, which uses the more easily measured mass (m) and length (l) of the short fiber optic cable.

$$\mu = \frac{m}{l} \tag{2}$$

From there, the length of the long cable L can be calculated using equation 3.

$$\begin{aligned} L &= \frac{M}{\mu} \\ &= \frac{Ml}{m} \end{aligned} \tag{3}$$

6. Conclusion

We conclude that roses are red and violets are blue.

7. Citations

[1] Mister Man, *Title of Reference*, Publisher, Year, Pages or Hyperlink.