

Name: _____ Sec./Group _____ Date: _____

5. Data

Fiber Length ΔL (m)		t1 (ns)		t2 (ns)		$\Delta t = t2 - t1$ (ns)		Avg. Δt (ns)	
		50ns/div	20ns/div	50ns/div	20ns/div	50ns/div	20ns/div	50ns/div	20ns/div
10	1								
	2								
	3								
20	1								
	2								
	3								
30	1								
	2								
	3								

6.1 Analysis

- 1) Plot ΔL vs. Δt for the three fiber lengths. From the slope of the straight line determine the velocity of light in the fiber, $c_n = \Delta L / \Delta t$.
- 2) Speed of light in vacuum, $c = n \cdot c_n$. (take $n = 1.5$)

6.2 Error Estimate

- 3) What is the uncertainty in your measurement of Δt ?
- 4) Suppose the length of the optical fiber is known to within a centimeter. What is the maximum estimated error in your measurement of the speed of light?

Determination of the Speed of Light in a Fiber

