

Waves on a String

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Data

Record the value of the length of the thin string.

Complete the table.

Table 1: Thin String

Trial #	n'	M' (g)	$\Delta M'$ (g)	L' (mm)	$\Delta L'$ (mm)
1	2				
2	3				
3	4				

Complete the table.

Table 2: Thick String

Trial #	n'	M' (g)	$\Delta M'$ (g)	L' (mm)	$\Delta L'$ (mm)
1	1				
2	2				
3	3				

Use the stroboscope to determine the frequency of the vibrating string.

Calculations

Record the standard value of the density of the string (given by your lab instructor).

thin string

thick string

Complete the table.

Table 3: Thin String

Trial #	n'	ρ (g/mm)	Percent Error (%)
1	2		
2	3		
3	4		

Complete the table.

Table 4: Thick String

Trial #	n'	ρ (g/mm)	Percent Error (%)
1	1		
2	2		
3	3		

Complete the table.

Table 5

n	Wavelength, λ (mm)	Mass (g)
6		
7		
8		

Questions

Can standing waves be produced along a string that is clamped at irregular intervals? Explain.

When standing waves are produced on the string by the vibrator, the string vibrates with the same frequency as the vibrator and a resonance is said to exist between the two. If the system is in resonance when the string vibrates in two segments, will the condition for resonance still exist if the mass on the string is increased by a factor of two? By a factor of 4? Explain.

Stringed instruments such as the piano, guitar, and violin produce sound when the strings vibrate in standing waves. What properties of waves affect the pitch, loudness, and purity of the musical note produced?

(a) pitch

(b) loudness

(c) purity of the musical note produced