Superposition & Standing Waves I

class the 8th
Did you complete at least 70% of the reading assignment?

1. Yes
2. No
2. Standing waves are caused by the superposition of:

A. 2 waves of the same frequency traveling in the same direction but out of phase with each other.

B. 2 waves of the same frequency traveling in opposite directions, OR

C. 2 waves of slightly different frequencies traveling in the same direction
Consider the Standing wave on the long spring.

- We will go to the CR
  http://stokes.byu.edu/123-resources.html
3. What is the wavelength of the wave which generates a standing wave with 2 nodes, as pictured?

A. \( \frac{L}{3} \)
B. \( \frac{2L}{3} \)
C. \( L \)
D. \( \frac{4L}{3} \)
Consider a 2-loop standing wave. If we increase the tension without changing the frequency, what can we get?

A. one loop  
B. three-loop

\[ \nu = \sqrt{\frac{F}{\mu}} \quad \text{and} \quad \nu = f \lambda \]
3. If we want to increase the number of loops in the standing wave, we should:
A. remove water from the beaker
B. Or add H₂O to the beaker
magnet  60 Hz  pulley  water
Physics 123
Lab #2
Standing Waves in a Wire

In this lab, you will produce standing waves in a wire. This is done by placing the wire through the poles of a magnet and passing an alternating current (60.00 Hz) through the wire. The resulting force of the magnetic field on the current drives the wire into a vertical oscillation at 60.00 Hz. The tension in the wire is equal to the weight hanging at the end. At certain tensions, the wire will resonate and produce visible standing waves.

Produce a standing wave by adjusting the amount of water in the container and thus changing the tension in the wire. (Don’t add any additional weight beside water. You may break the wire.) Using a meter stick, measure the wavelength $\lambda$ of the standing wave. Calculate the velocity $v$ of the waves in the wire. Weigh the container of water to obtain its mass $m$. Calculate the tension $F$ in the wire. From $F$ and $v$, calculate the linear mass density $\mu$ of the wire. Repeat this for a different standing wave.

<table>
<thead>
<tr>
<th>1st Standing Wave</th>
<th>2nd Standing Wave</th>
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<tbody>
<tr>
<td>$\lambda =$</td>
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<tr>
<td>$v =$</td>
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<td>$m =$</td>
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<td>$F =$</td>
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<td>$\mu =$</td>
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Part. pt. 4 Consider standing waves in an air column inside a pipe (one end closed).

1. Only even harmonics are present.
2. Only odd harmonics are present.
3. Both even & odd harmonics are present.
Enter question text...

1. Enter answer text...
1. Enter answer text...