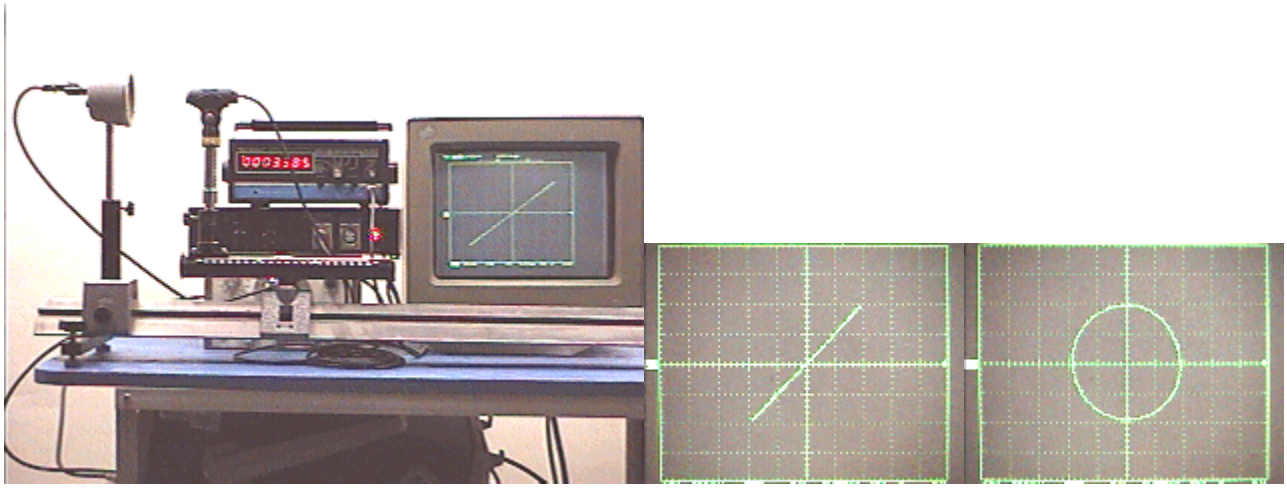
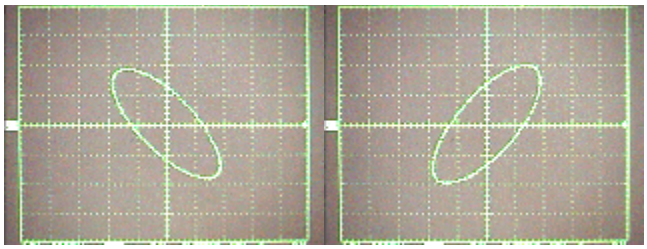
Question #157

Using the apparatus shown in the photograph at the left below, a 5000 Hz sine wave from a wave generator is fed simultaneously into a tweeter (at left on optical rail) and the horizontal axis of an oscilloscope. A microphone (at right on small optical rail) picks up the signal about 10 cm from the speaker; its output is wired into a small amplifier and then into the vertical axis of the oscilloscope. By adjusting the distance between the loudspeaker and the microphone so that these two signals are in phase, the Lissajous pattern shown in the center figure below can be produced. When the microphone is moved away from the loudspeaker by one-quarter of a wavelength, the Lissajous pattern becomes a circle, as seen in the photograph at the right.



Now suppose that a heat gun heats the air between the loudspeaker and the microphone. How will that affect the Lissajous pattern? In particular, will the pattern look more like the figure at the left below or the right below? On the other hand, perhaps it will not change.



When the heat gun is turned on and heats the air between the loudspeaker and the microphone, the pattern will:

- (a) look like the pattern at the left above.
- (b) look like the pattern at the right above.
- (c) remain unchanged.

Click here for Answer #157 after September 29, 2003.

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For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.