



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Evie S. Pless	Project Number J0723
Project Title Laser Microphone: Sensitivity of Two Interferometer Designs	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To see if I can set up a laser microphone (made from a laser interferometer) sensitive enough to be able to hear someone speaking on the other side of a window. Also, to measure the difference in sensitivity between my design of a laser interferometer and the Michelson interferometer.</p> <p>Methods/Materials I built and tested Laser Microphones using Michelson's design and my own design of an interferometer. I tested the difference in sensitivity between the two interferometers in two ways. First, I compared them using an oscilloscope. Then I measured the difference in the volume settings on the amplifier necessary for me to be able to hear the test vibrations. Each laser interferometer was built from the following: 2 front surface mirrors, 1 beam splitter, 1 solar cell (photo detector), 1 laser pointer, 3 fixed mirror holders, and 1 adjustable mirror holder. An amplifier with a speaker was attached to the solar cell to make the laser microphone.</p> <p>Results I was able to successfully use the Michelson interferometer in a laser microphone. My design of an interferometer did function but was not sensitive enough to be used in a laser microphone. Using an oscilloscope to compare sensitivity, the Michelson interferometer was 20 times more sensitive. When I tested with the volume setting on the amplifier, the Michelson interferometer was 6 times more sensitive.</p> <p>Conclusions/Discussion Using the Michelson's interferometer I was able to build a Laser Microphone that was sensitive enough to pick up vibrations from a window and turn them back into understandable words. Though the my design was not as sensitive as the Michelson interferometer, the sound it produced was more realistic when testing the sensitivity.</p>	
Summary Statement I compared two interferometers for sensitivity, and tested them in a laser microphone.	
Help Received My dad discussed the project with me and helped purchase parts. My mom proofread my poster.	