CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Andy Chon; John Lee

Project Number
S0703

Project Title
Converting Ambient Sound into Electric Energy by Utilizing a Dynamic Cone Speaker

Abstract

Objectives/Goals
The purpose of this experiment was to determine what effect sound decibel, frequency level, and proximity from a sound source, had on voltage output measured by a voltmeter, which was connected to the input terminals of a receiving speaker. There are a few fundamental elements of the mechanics behind sounds waves that were needed to be discussed prior to understanding the results of this experiment coherently. The speaker incites an impulse, it applies a chunk of energy to the air. As the front expands, the energy is spread, in a way suggested by the relationship between the radius and area of a sphere, A=4I#r The total energy stays the same, the area expands, so the energy in one unit of area decreases with the square of the distance from the source. The front will continue moving until there isn't enough energy to measure. This information explains why the results in this experiment were obtained.

Methods/Materials
To find the various trends that were needed to answer our hypothesis, an experimental design containing two dynamic cone speakers, acoustical equipment, and electrical equipment were used. The experiment began by the use of various programs that provided a constant sound sample at different frequencies and intensity levels. This was then replayed by the source speaker, which would send the sound waves through the medium of air at specific distances away from the receiving speaker. The receiving speaker then in turn captured these sound waves and turn them from a physical state of energy to a electrical state, in which the voltmeter indicated a AC current being produced from the input terminals of the receiving speaker.

Results
The experiment yielded results with a mean between 0.050 and 1.655 Volts AC for each frequency level. The average deviation was between the range of 0.001 and 0.002. The percent deviation 0.060% and 4.255% for each frequency level.

Conclusions/Discussion
The results conclusively pointed out to the reasoning that although with the same amount of energy used, the way in which it was changed caused the resulting output voltages to vary based upon the properties of a sound wave.

Summary Statement
Conceiving a way to harness and channel ambient sound into electric current through the use of a dynamic cone as a receiving apparatus.

Help Received
Partner helped complete this whole project