Jan 10th, 12:00 AM

16. Physics

University of Central Oklahoma

Abstracts from the 2013 Oklahoma Research Day

Held at the University of Central Oklahoma

05. Mathematics and Science

16. Physics

05.16.01 Examining Acoustic Attenuation Coefficient In Salt Water Solution

Chiemi Standridge,

East Central University

The experiment indicates the acoustic coefficient attenuation in salt water solution using 1Mhz and 4Mhz transducer. Two types of salt will be used in the experiment, rock and table salt. The values of attenuation coefficient will be plotted against the value of concentration of salt. This is an updated version, the same one I presented at Research Day.

05.16.02 Size and Mass of Cooper Pairs in Superconductors

Sasha Townsend, Jon Snellgrove, Tyler Nitsche,

Tulsa Community College

Superconductivity is a remarkable phenomenon characterized by the complete vanishing of electrical resistance which allows a current to circulate around a superconducting wire indefinitely and by the ability to expel magnetic fields that permit a superconductor to levitate above or below a magnet or vice versa. The expulsion of magnetic fields is called the Meissner effect. Superconducting properties of materials arise from formation of electron pairs, called Cooper pairs. The microscopic parameters of superconductors, including mass and size of Cooper pairs, can be probed via measurement of the profile of the magnetic field penetrating the superconductor in the Meissner state. This is a project currently running at Tulsa Community College and supported by the National Science Foundation. Results obtained in this project will be presented and discussed.

05.16.03 Acoustic Attenuation Coefficient

Kristen Howard,

East Central University

Through this research I will obtain the acoustic attenuation coefficient in saltwater. In this experiment I used a 1MHz and a 4MHz transducer as well as rock salt and table salt. To find the attenuation coefficient I poured water mixed with salt increasing from five to eighty grams of either rock salt or pure salt into a cell block. I then used the 1MHz or 4MHz transducer to determine the amount of time it took the sound waves emitted from the transducer to travel from one end of the cell block and back. To find the acoustic attenuation coefficient I used Beer's Law $\alpha=((-\ln(A/Ao))/2fx)$. A is the second peak in mV, Ao is the first peak in mV, f is the frequency of the transducer, and x is the cell width. The values of the attenuation coefficient were plotted against the values of concentration of salt to examine patterns between the saltwater. The results of rock salt: 1MHz transducer $\alpha=-0.395$ dB/MHzcm, 4MHz transducer $\alpha=-0.328$ dB/MHzcm. The results of pure salt: 1MHz transducer $\alpha=-0.359$ dB/MHzcm, 4MHz transducer $\alpha=0.184$ dB/MHzcm. The acoustic attenuation coefficient and optical attenuation coefficient may have a linear or predictable relationship. If this idea is correct it can help with the over treatment and under treatment of patients during laser surgery. By improving the technique to obtain the acoustic attenuation coefficient the relationship with optical attenuation coefficient can be found. We must also examine why alpha is negative and