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16. Physics

Northeastern State University

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Abstracts from the 2016 Oklahoma Research Day

Held at Northeastern State University

05. Mathematics and Science

16. Physics

05.16.01 Attenuation Coefficient Studies in a Polyacrylic Solid Using the Slope Method

Williams, Karen *East Central University*

Previous findings revealed that the attenuation coefficient in liquids was not reproducible. Ultrasound attenuation coefficients in publications vary significantly from one another. This research utilized the slope method to obtain the ultrasound attenuation coefficient in solid polyacrylic. The temperature and frequency dependence of the coefficient was also studied as a variable that might cause a problem in reproducing the attenuation coefficient. An echoscope interfaced to a PC with 1, 2, and 4 MHz transducers produced a graph of amplitude versus distance via A-scan software. The amplitude of the original wave and the echo in polyacrylic objects of fixed size was measured for six polyacrylic objects. Bouguer's Law and Graphical Analysis was used to calculate the natural log of the ratio of wave to echo and calculate the slope. The attenuation coefficient obtained was 0.1679 dB/mm for 1MHz, 0.1673 dB/mm for 2MHz, and 0.2259 dB/mm for the 4MHz transducer. The coefficient obtained when data was taken in colder temperatures was always slightly less than the coefficient taken in a warmer room, but was not outside the uncertainty of the slope. The frequency dependence on coefficient was also examined.

05.16.02 GRB-SNE 150518a at Different Wavelengths

Apala, Elizabeth *East Central University*

Soderberg, Alicia *Other*

West, Michael *Other*

Gamma Ray Burst (GRB's), extremely energetic flashes of Gamma Rays, are caused by either deaths of massive unstable stars or colliding binary neutron stars. A unique burst, GRB 150518a, had two recorded bursts fifteen minutes apart which is very rare and is considered to be ultra-long, lasting around thirty minutes total and is associated with a Supernova explosion. Gamma rays are emitted by supernovae, neutron stars, black holes, and quasars and by studying GRB's it allows us to see more deeply into how these objects function. The first few days of GRB 150518a's detected afterglow was plotted in different wavelengths, including optical, x-ray, radio, and infrared, in flux versus time. Data is continuously being added as time goes on.

05.16.03 Affective and Emotional Composite Temperament Scale: Study on the validity of the measure

Scott, Jenn *University of Central Oklahoma*

Introduction Research on the Affective and Emotional Composite Temperament (AFECT) Scale seeks to provide an adaptive and complex self-report scale for clinicians to allow for a more integrative approach to long-term emotional and affective states (Lara, Bisol, Brunstein, Reppold, Carvalho, and Ottoni, 2011). The AFECT scale identifies 12 affective temperaments to be used as a basis for diagnosis. The present study seeks to further validate the AFECT scale. Method The present study will recruit participants through the University of Central Oklahoma, and participants will receive class credit in exchange for participation. Each participant will be presented with the AFECT self-report scale. Each participant will also receive the PANAS (Watson, Clark, and Tellegen, 1988) self-report scale, a successfully validated measure that seeks to establish elements of mood. The present study will administer both scales to each participant. After a week to two week break, participants will return and take both measures again. Discussion The results will be measured for consistency across the time span, and a measure will be taken between the PANAS and AFECT to assess consistency. Discussion will focus on the implications of a self-report scale considerate of long-term temperament in relation to clinical assessment. Keywords: personality, PANAS, AFECT, mood, clinical psychology, temperament