

Abstract Submitted  
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**Intensity and Temperature Variance in Sonoluminescence** LYRIC ELIZABETH GILLETT, Cornerstone High Homeschool — Sonoluminescence is the process in which light is produced through ultrasonic pressure waves causing the expansion and subsequent collapse of a gas/vapor bubble, held in an ultrasonic standing wave pattern, in water. This study measured sonoluminescent bubble light intensity output with a photomultiplier tube and a lock-in amplifier, to determine the relationship of the sonoluminescent intensity to variance in water temperature. The results could be indicative of the optimal temperatures at which to conduct sonoluminescence research, and assist in facilitating and advancing sonoluminescence research ventures relating to further study of energy production and nuclear reactions. Though not part of the original experimental design, the initial experimentation suggested a positive correlation between the drive level of the transducer and the light intensity from the sonoluminescent bubble. Further experimentation was conducted in which the transducer drive signal and frequency were continuously optimized as the water temperature rose. After data was graphed and analyzed, it was determined that there was a decrease in sonoluminescent intensity as the water temperature increased. The intensity of the light emitted by the sonoluminescent bubble is understood to be directly related to the density of plasma created in the bubble upon collapse (through Bremsstrahlung.) It is believed that this experimentation resulted in a greater plasma density inside the sonoluminescent bubble, and to that end, this researcher would like to conduct further experimentation.

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