CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)

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Project Number

S1599

Project Title

The Effects of Radiation and Viscosity on Sonoluminescence

Abstract

Objectives/Goals

To determine the effect of exposure to radiation and the effect of viscosity on stability and consistency of single-bubble-sonoluminescence (SBSL).

Methods/Materials

Flask with transducers, circuit outputting 800VAC p-p at about 30kHz, microphone transducer attached to oscilloscope, refrigerator to maintain stable temperature, heating wire to induce bubbles, radioactive sources, acetone.

Sound was driven into the flask at frequencies near 30kHz using different viscosities and exposures to radiation. Effectiveness was measured by consistency of bubbles and symmetry of bubble frequency.

Results

Results are pending the receipt of experimental variables (sources of radiation and acetone. It is expected that radiation will detract from stability, and viscosity will add to stability, up to the point of being too thick to transmit vibrations.

Conclusions/Discussion

The sources of radiation, by adding high-energy particles to the bubbles, will likely cause turbulence. This is an issue because a successful fusion reaction would involve substantial neutron radiation, which would therefore disturb the continuing process. Viscosity will contribute a stability to the environment of the bubble and will resist deformation.

A process of combining Eigenmodes of the flask, such that the two added waves would result in beats of the previously used frequency, around 30kHz, was attempted, but the audio amp#s fuse failed during the testing. It was thought that using beats of the desired frequency, while comprised of much higher-energy waves, would allow a substantially increased energy in the center.

Summary Statement

Determining the effect radiation and viscosity has on SBSL bubbles

Help Received

Physics teacher offered suggestions and help with gathering data.