

Team Third Report

Zach Taylor

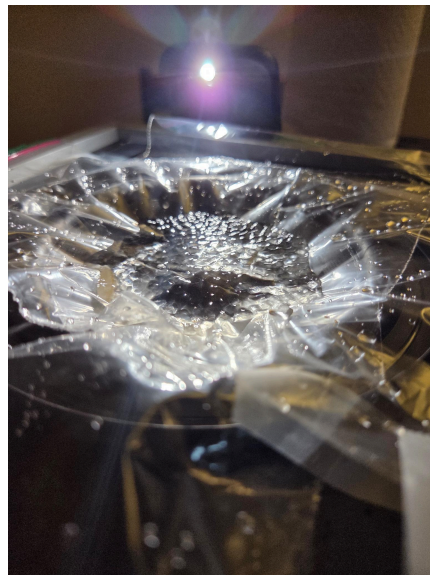
ATLS 4151-5151/CVEN 4833-5833/MCEN 4151-5151

Collaborators: Kai Hansen, Cooper Wyrick



The image captured depicts the effect of low frequencies at high volume on an amount of water. We used a subwoofer flipped upside down and the cover removed from the horn, placed plastic over the diaphragm to protect it, and then poured a cup of water onto the plastic. The water was used to demonstrate the patterns created by sound waves, travelling at different frequencies and with different amplitudes. Lower bass frequencies produce extremely noticeable ripples in water, which is captured in the picture.

The frequency used for this picture was around 82 Hz, played using a sine wave synthesizer. Higher frequencies produce smaller ripples, so a lower frequency was needed. The subwoofer used was a Yamaha YST-SW010, connected to a JVC RX-R73TN Receiver. The receiver was connected to a computer playing the sine waves. The shapes formed in the water, depending on the pitch, are called Chladni figures, named after an 18th-Century physicist. It is more common to observe these figures with a medium like sand on a steel plate with a tone played through it, because using water distorts the figures when the water contacts the sides of the container.



To take the photo, we used two phone flashlights aimed from different angles at the water, so as to better capture the effect. The photo I took was with my phone, a Samsung Galaxy s25, with the 10MP, f/2.4 telephoto camera. When editing, I cropped the image to remove unrelated elements, increased the contrast, decreased the chroma, and decreased the exposure.

References:

<https://cymascope.com/cymatics-history/>

https://www.radiomuseum.org/r/jvc_fmam_receiver_rx_r73tn.html

https://usa.yamaha.com/files/download/other_assets/9/319829/01_om_yst-sw010.pdf