

Fluir

Visuals & Music: Alejandra Abad - MFA Art Practices Candidate

Team 4 Schlieren: Alejandra, Dimario Cancanon, Jamie Frankel

Assignment: Team Third

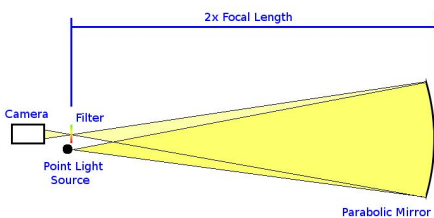
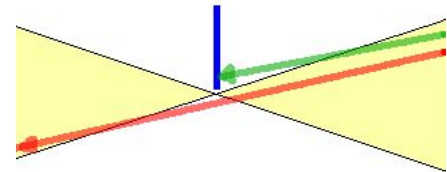
Class: Flow Visualization - ARTF 5200-001

Date: 12/2/19

First Paragraph: For the last Team Third assignment, our goal was to capture the air flow from turning on a candle lighter or burning a piece of paper. The flow would be demonstrated by using the schlieren effect. By using this technique we were able to capture the thermal plume of a lighter and a paper burning. Our team consisted of Jamie Frankel, Dimario Cancanon and me. We all decided to make videos from this experiment.

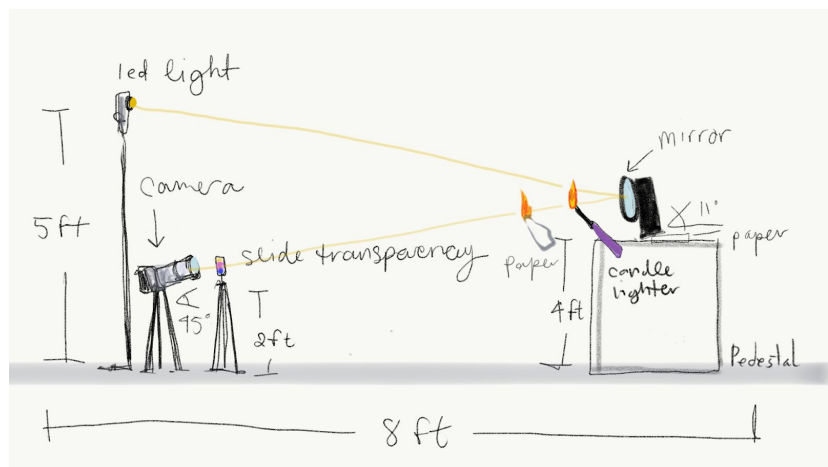
Second Paragraph: In order to get the schlieren phenomena, we needed to capture the “difference in air density” as we turn on the candle lighter in front of the mirror. “When a gas is heated it expands, and when it cools it contracts... When light passes through materials with different densities, it refracts (Schlieren Photography - How Does It Work?).

We used a single aluminized first surface spherical mirror and the z-style. Our camera and light source had to be placed exactly twice from the mirror so it could bounce right back to it. We cut the light with a color slide.



Third Paragraph: Dimario turned the led light pointed it to the mirror. Jaime moved the mirror by adding paper on the bottom as to angle the light into

the lens. The lens was Telephoto lens so that I could zoom in and get really close to the mirror. I was also in charge of the cutting of the light as to create the schlieren effect. When I move the slide with the color transparency. We used my studio to set up the



experiment. The Aluminized First Surface Spherical 4.25" Mirrors rested on a 4 feet tall pedestal. The camera was on a tripod that was placed 8ft from the mirror and placed across from the pedestal. We turned off the lights inside the studio. We placed an LED light on a tripod that was able to be pulled to 5 feet in height. The camera was lower, about 2 feet in height and the angle of the telephoto lens was at 45 degrees.

Fourth Paragraph: We used shadow and schlieren photographic technique, we made those choices by removing or adding the slides that had the color transparencies. We decided to use the telephoto lens in order to get closer to the image reflected onto the small mirror.

- Aluminized First Surface Spherical 4.25" dia., 45" FL, $\lambda/8$ Surface Accuracy Mirrors
- The size of the field 8 feet from mirror.
- The candle lighter was two inches from the mirror and sometimes a couple inches farther.
- The width 4 inches.
- 1 inch from the color slide that cut the light.
- The distance from the light to the mirror to the lens 16ft
- I used a Telephoto, zoom lens, EF 70 -200
- I used a Canon EOS 80 D digital camera.
- Original and final video 1920 x 1080 aspect ratio
- Exposure specs: ISO setting 1000, f4.5, shutter speed 160
- Adobe Premiere, 1080p30 (29.97)

Fifth Paragraph: I was not sure if we were going to be able to see the heat flow from the lighter, however once the slide was used to cut the light, one could start to see the heat flow from the candle lighter. This is due to "refraction due to inhomogeneity in air caused by changes in the density, temperature, or pressure of the air immediately in front of the concave mirror (Schlieren Optics). With our camera we saw warm "convection currents" rising from a candle lighter flame and paper burning. It was difficult to get the light to go into the lens that was reflected onto the mirror. I would definitely love to continue to play by using different set ups. I loved editing all of the many tries we did in order to observe the phenomena.

Works Cited

“Schlieren Optics.” Schlieren Optics,
<https://sciencedemonstrations.fas.harvard.edu/presentations/schlieren-optics>.

“Schlieren Photography.” Wikipedia, Wikimedia Foundation, 30 Nov. 2019,
https://en.wikipedia.org/wiki/Schlieren_photography.

“Schlieren Photography - How Does It Work?” HOWTO: Schlieren Photography,
<http://www.ian.org/Schlieren/HowTo.html>.

SCHLIEREN PHOTOGRAPHY PRINCIPLES,
<https://people.rit.edu/andpph/text-schlieren.html>.