

Team Second Report
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<https://youtu.be/DN3bUt-xYDc>

The context of the video is I was on a camping trip near Estes Park and we had to pour ice over the firepit for the coals to die before we left because the wind was so strong it kept heating them up. The combination of steam from the ice and smoke from the coals produced an interesting effect so I took a high-framerate video of it with my phone. I later used a similar technique to the one I used on the Team First assignment to produce a motion extraction effect in Adobe Premiere.

The actual specifics of the flow apparatus are irrelevant or not reproducible. The frame captured is of the middle of a firepit with tall walls, so most of the motion extracted is not directly acted on by the wind or the boundaries of the pit. Most of the motion visible is most likely due to the effect of heat on the density of gas, allowing smoke to rise upwards from the coals due to being less dense than the cold air around it. There are also likely some effects from the wind interacting with the walls of the firepit, but I couldn't describe them in proper detail or with any degree of scientific accuracy, due to the shape of the firepit being irregular and undocumented. It should be noted though that the flow of the smoke is entirely turbulent, as it interacts with the pressure caused by the wind and heat immediately.

The video was shot on a Samsung Galaxy s25 with the slow motion function, enabling higher frame rate video. The camera used was a 10MP, f/2.4 telephoto camera, the narrowest angle camera of the three front facing cameras on the phone. This is the phone which I also used in my Team First submission. The saving grace of the video is the motion extraction, which I worked to improve to moderate success. My goal was to completely isolate the motion extracted layer of the video, with everything else turned to black. An example of this effect is listed at the top of the references. This is harder to achieve, as the motion extraction effect is the result of multiple effects acting on two different video tracks. It is hard to chroma key or add a color effect to one or both tracks and still keep the motion extraction. The best I was able to do was make the base video pop a lot more, increasing the exposure and contrast. This helped improve the video which was unusually very ugly looking right off the phone, most likely due to limitations regarding the high-framerate lens. I was also able to make the effect more intense by exporting the extracted video and running the effect again, repeating this around 5 times until it became very strong. It can be noticed, though, that the more the effect is applied, the jitterier and grainier the video becomes. I speculate that this may be due to me having partially held the phone with my hand, so that the video shakes a little. As a result, the motion extraction was probably applied to the entire video very subtly.

References:

<https://youtu.be/NSS6yAMZF78?t=131>
<https://van.physics.illinois.edu/ask/listing/2179>
https://www.gsmarena.com/samsung_galaxy_s25-13610.php