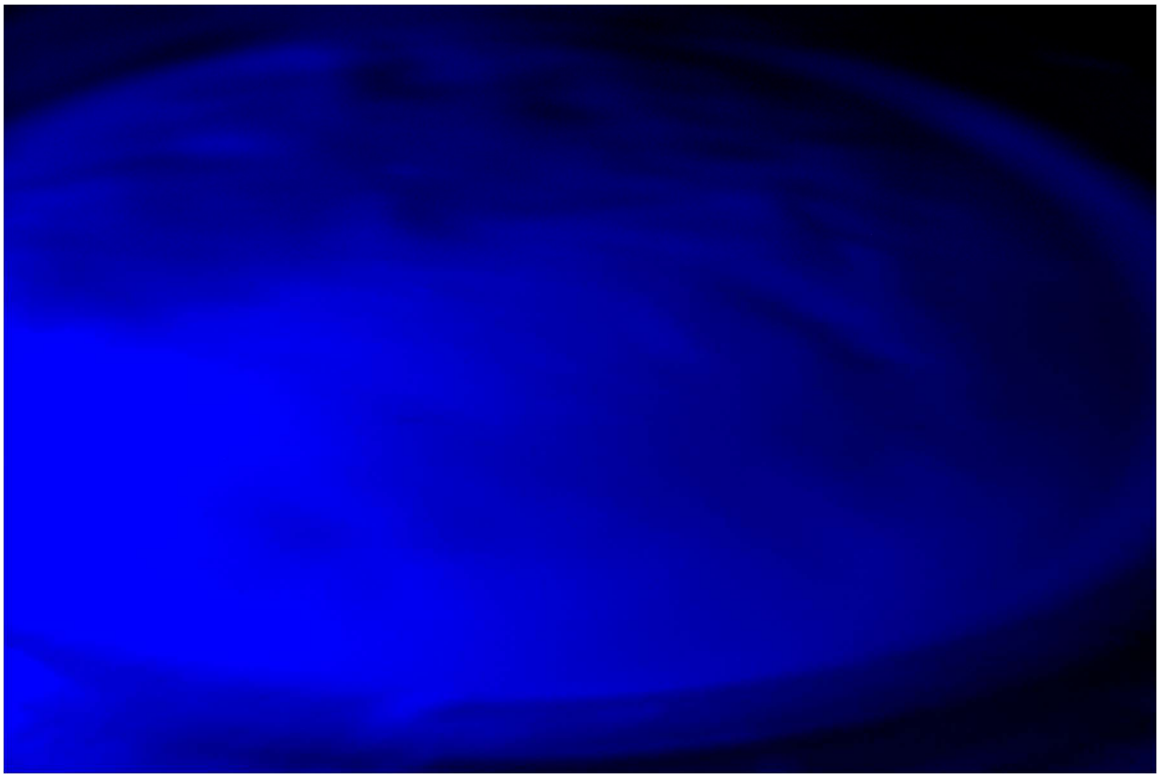

Team First Project Report

Sung Moon (with help of Cyron Completo) | MCEN 4151 | 2018-03-07

In our second image assignment, Team First project, the purpose was to get together with your team to take and help to take a picture of fluids of our choice that clearly exhibits both aesthetics and phenomena that is being experimented. The Team First project allowed the students to expend their artistically developed interests and physics knowledges furthermore than the Get Wet Project by adding more hands on deck. For my project, some of my team and I came together to think of cool fluid tricks to perform using oobleck and decided to just mess around with the oobleck. As a novice to the photographic field, my goal in this project was to have a picture that vividly demonstrates what is going on in the picture and some aesthetical meaning. With the image itself, its intent was to explicitly illustrate the non-Newtonian fluids mechanics. Cyron Completo helped and supplied me with his camera and oobleck fabrication.

In my image, oobleck was fabricated with the cornstarch and tonic water. We used tonic water so that the oobleck could glow under the blacklight. Even with the tonic water, our oobleck still acted as non-Newtonian fluid. The non-Newtonian fluids are so-called ‘strange liquids.’ Compared to the ‘normal liquids’, liquids that are shaped as the shape of a container they are poured into, the non-Newtonian liquids do not obey the same rule. Non-Newtonian fluids alternate their viscosity under different stresses. If force is applied to such fluids, the unexpected stress will trigger fluid to act like a solid or runnier fluid. In the case of oobleck, it behave likes a solid all of sudden. The oobleck particles lock together and can even roll into solid ball. In my Team First oobleck image, I started to apply force at the bottom of the plate where oobleck was poured into. I started to notice that if I smack the plate into the table, I could see the whole oobleck starting to shape like a cloud. I applied enough force to the plate so that if I was to apply the identical force to the water, I would empty out the plate.

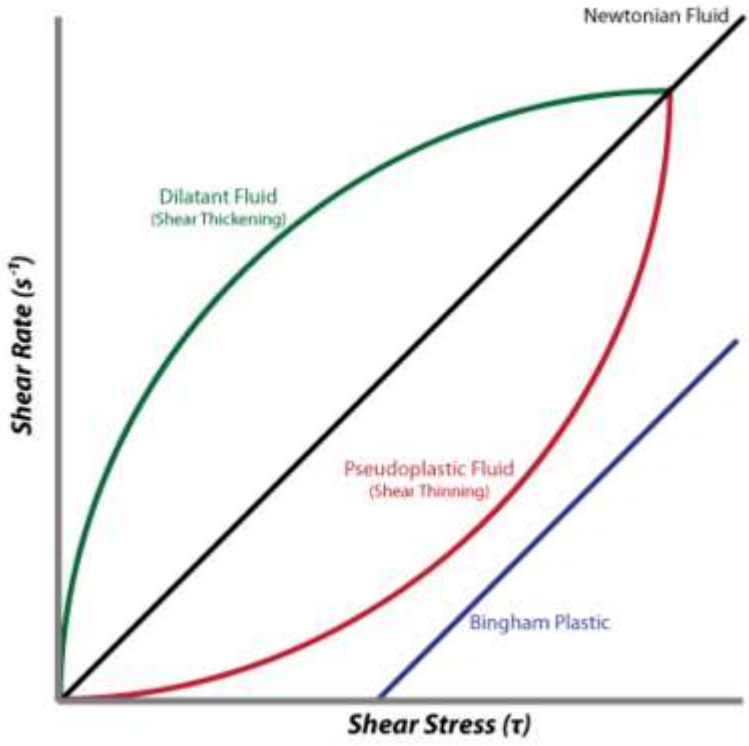

Figure 1: Shear Rate vs. Shear Stress Plot

As one can see in the Figure 1, the viscosity of Dilatant Fluid, an example of a non-Newtonian Fluid, increases as the shear rate increase. The viscosity of Dilatant Fluid is dependent on the shear rate.

I poured the oobleck into the flat plate. Then, I turned the light off in the room to enhance the effect of black light. Last but not least, I was whacking the table with the oobleck plate to create motions in the oobleck. To visualize better flow for my image, I used tonic water with black lighting.

From the original image, I really could not see the full motion of oobleck because it was a bit darker than I expected. What I decide to do was to adjust the contrast and brightness of the image and save as png file in Photoshop. I thought exhibiting full flat plate was very useless and distractive to the audience. As a beginner in camera world, I didn't have any intricate camera skills to film my motion blurs, so I borrowed Cyron's camera and camera knowledge.

Citation

Dilatant. (2018, March 03). Retrieved March 07, 2018, from https://en.wikipedia.org/wiki/Dilatant

Non-Newtonian fluids. (n.d.). Retrieved March 07, 2018, from https://www.sciencelearn.org.nz/resources/1502-non-newtonian-fluids