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Film 4200 (Jean Hertzberg)  
Team 1 Report  
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The purpose of this assignment was to document for later display the effects of a magnetic field on Ferro fluid. While photographs of the interaction between Ferro Fluid and a magnetic field offer a reasonable amount of detail my team felt that a video would offer an enhanced view of the phenomenon that would be unattainable through a single photo. Originally, my team members and I desired to make use of a high-speed video camera. While some of my teammates were successful in using the high-speed camera and resulting footage, I encountered several obstacles that required me to make use of a standard speed camera. The same phenomenon, however, was recorded.

Because of the dark color of the fluid I chose to document for this project, I decided that a white background would provide the highest contrast. I expected that the physics displayed by the video might be viewed more clearly if there was a high level of contrast between the background and the subject (Ferro Fluid). With this decided, I created a set that was composed of white poster board. The poster board was placed behind and under the subject. The remaining three sides as well as the space above the subject was left open for lighting purposes. Two, half-inch ceramic disk magnets were placed under the base sheet of poster board and a teaspoon of Ferro fluid was dropped onto the magnetized area. Three magnets of the same size were placed on a 6x6" sheet of plexi-glass. The plexi-glass was then lowered to a height that allowed for viewing of the effects of the magnetic field on the fluid. The Plexi-glass was continually lowered until a sufficient amount of Ferro fluid was retained by the magnets thereon. Ferro fluid is often used to determine the properties of a magnetic field. This particular experiment accomplishes exactly that. From the video, one can see the structure of the magnetic field. The actual flow of the fluid from the floor (poster board base) to the ceiling (plexi-glass) highlights where the magnetic field is strongest.

As before stated, white poster board was used because of the high contrast it provided with the near-black hue of the Ferro fluid. In addition to contrast, the white of the poster board scattered the light such that the visibility of the image was enhanced without the use of a large number of lights. Two 500 watt halogen work lights were used to illuminate the set while recording was taking place. Both light were placed just behind and above the camera. My intent was to scatter as much light as possible off the poster board at the back of the set. I strove to avoid having any direct light from the halogen bulbs fall on the subject.

For this video I chose a camera position that made the perspective perpendicular to the axis of the magnetic poles. The camera was placed 3 inches from the subject with a field of view of about 3 inches. The video was taken at 25 frames per second. This video was taken with a Sony DSC-H3. The dimensions of the video are 640 x 480 pixels. As is the case with many digital cameras, the white balance must be set correctly to achieve proper color record. For this video the white was balanced to florescent light. ISO was set at 400.

I believe that this image displays a good example of the physics that I originally sought to portray. I would like to have presented a video that showed this phenomenon at

a much higher frame rate. I also would have liked an assistant. There would likely have been more room for experimentation with the fluid had there been more than one person present at the time the experiment was conducted. Overall, I believe that the video is successful and displays the physics in a manner that makes them more easily viewed than if through a single photo.