

**Drexel University Society of Physics Students
Sigma Pi Sigma Undergraduate Research Grant
Interim Report**

The Society of Physics Students' Variable Star Observation and Search at Drexel University is in full swing. After receiving the award, the lead members of the group began learning in detail how to observe variable stars through sources such as the American Association of Variable Star Observers (AAVSO) webpage, and professors in the Astrophysics Department. In the following weeks, the committee made several trips to the Joseph R. Lynch Observatory to begin to learn the basics of operating the telescope, with help from Astrophysics graduate student John Parejko. Then we instructed the other ten members of the research group in what we had learned. Since some members of SPS are now trained in use of the telescope, our observatory open houses at Drexel have become more efficient and informative because of the number of knowledgeable students available.

After basic operation of the telescope was mastered, we began taking CCD images. It was soon realized that our images needed much better focus. Drexel had recently purchased a fine auto-focuser that we helped to install. Some of our images included Messier Objects such as M3, M51, M64 and M104 (see below) and various variable and double stars. We started with these larger, brighter objects because they were easier to gather light distribution curves and to determine if the focus and setup was sufficient for photometry.

In terms of image analysis, we have been able to obtain and apply dark frames and flat fields with success, optimizing the quality and clarity of the images we have taken. We have also been able to perform some basic photometry, analyzing the light distributions and magnitudes of objects and stars in our images. Our current method of data extraction, however, is done manually and thus is slow and tedious and so we do still plan to purchase image processing software.

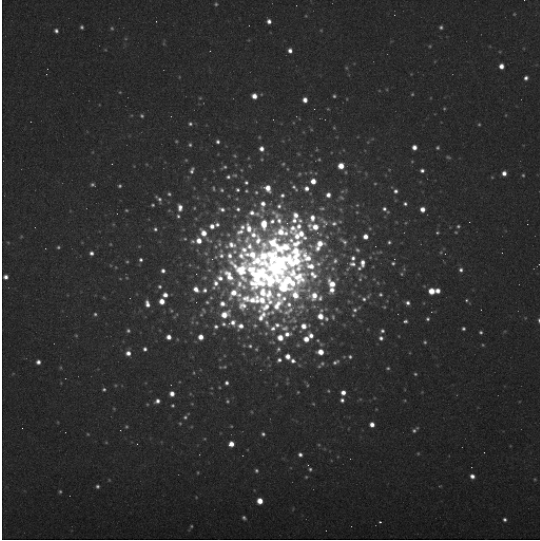
Further improvements in our project involve augmenting our telescope's ability to track the sky. Less than 100 feet from the observatory, runs an enormous industrial train line that passes through several times a day, causing gradual but appreciable offset to the telescope's mount position due to the vibrations it gives off. Since the inherent alignment of our mount is not perfectly accurate, a precise polar alignment is practically unachievable without significant modification. Without a good polar alignment, the telescope does not track the sky accurately. One product that remedies this is a field de-rotator, which uses a small CCD to adjust the field of view as objects move across the sky. This way, an exact polar alignment is not necessary because the de-rotator is able to correctly follow the sky. Other things that are still in the projected budget are color filters, which are necessary for photometry.

We have recently begun imaging several well known variable stars with a range of periods in attempt to generate preliminary light curves. As we continue to improve the telescope setup and learn more about image analysis and photometry over the summer term, we hope to produce enough accurate data on known variable stars to begin examining lesser-known variable stars and searching for new variable stars by the beginning of the fall term. We also hope to attract the incoming freshmen to SPS with this well-established and long-term research project.

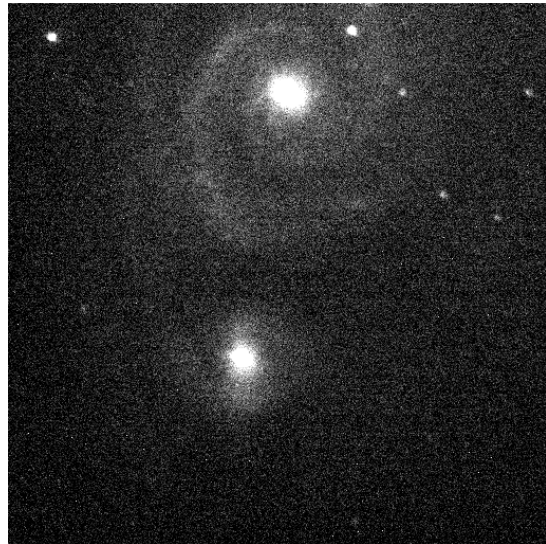
Drexel Variable Star Project Committee

Anna Petrone, Sajjan S. Mehta

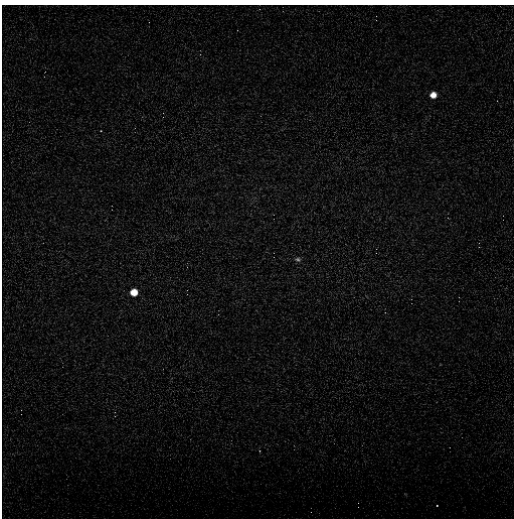
Recently Acquired Data



The Messier Object M3
imaged June 2, 2008



The Messier Object M51
imaged April 28, 2008



Variable Star R Ursa Major
imaged June 2, 2008