



Explore the Universe: A Study of the Delta Scuti Variable Star SZ Lyn

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Introduction

The purpose of our project was to gather data on the Delta Scuti variable star SZ Lyn and to confirm its period. We accomplished by taking many exposures of the star, using AstrolmageJ to calibrate the data, and using phase plot method to create a light-curve.

Variable stars change in brightness over time. The specific subclass we chose is a Delta Scuti pulsating star. The Delta Scuti, like other pulsating variables, vary in brightness due to the changing opacity of their helium-rich atmospheres and the cyclic trapping of light, heating, expansion, release of light, cooling, and contraction.



Figure 1: UMD Observatory

Results

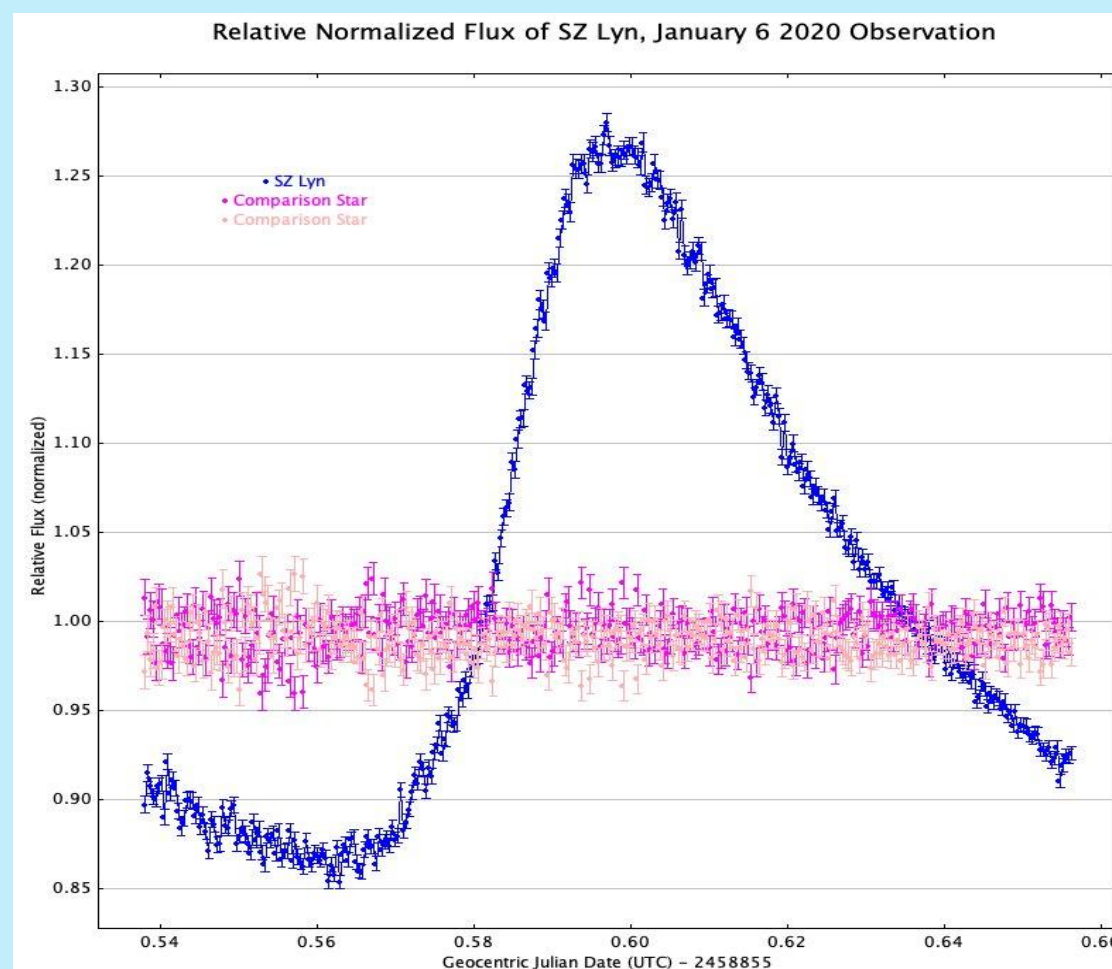


Figure 2: Lightcurve of SZ Lyn determined from differential photometry based on January 6, 2020 Observation.

Analysis

We found that SZ Lyn varies in brightness between about 0.85 and 1.25 times the normalized flux of the two comparison stars over a period of about 0.12 days, or around 3 hours. We were unable to determine the true variation in the star's brightness as a result of using differential photometry and time constraints.

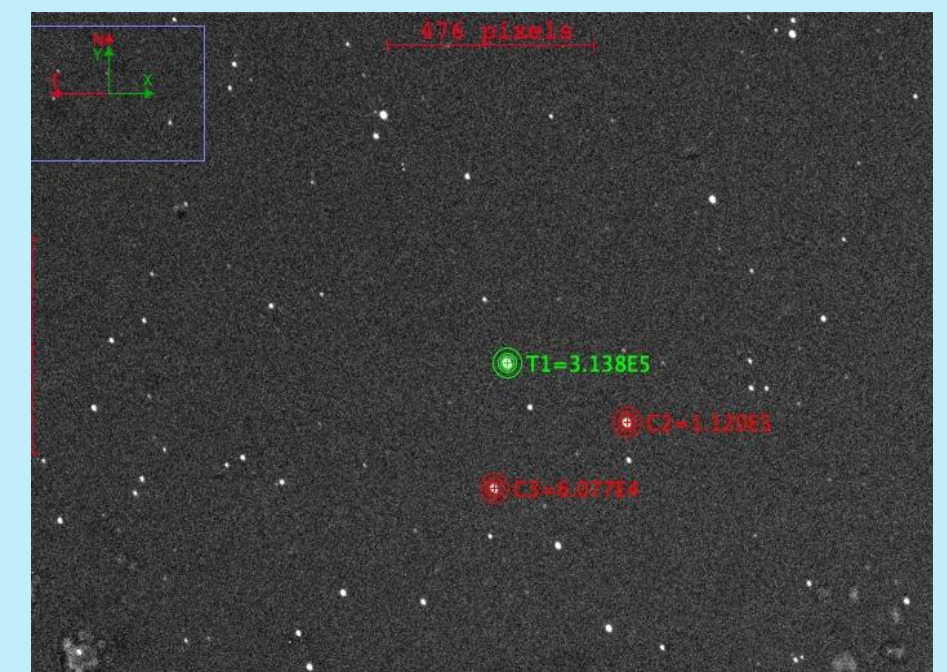


Figure 3: Differential photometry exposure (above). Green: SZ Lyn; Red: comparison stars.

Methods

Observing:

To gather data on the stars we took hundreds of exposures (images) of the star as it transited across the sky.

Calibrating Data:

We used AstrolmageJ to calibrate the data. The software achieves this by subtracting unwanted signals and noise from the main exposures.

Differential Photometry:

We also used AstrolmageJ to conduct differential photometry on our data. We then qualitatively determined the star's flux variation and period based on this differential photometry.

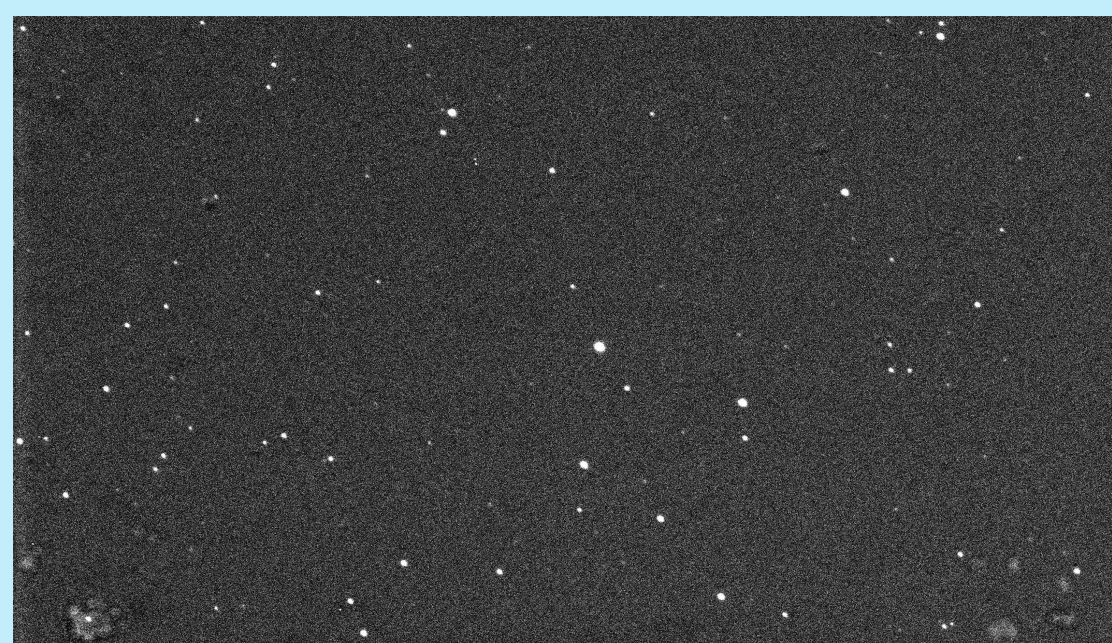
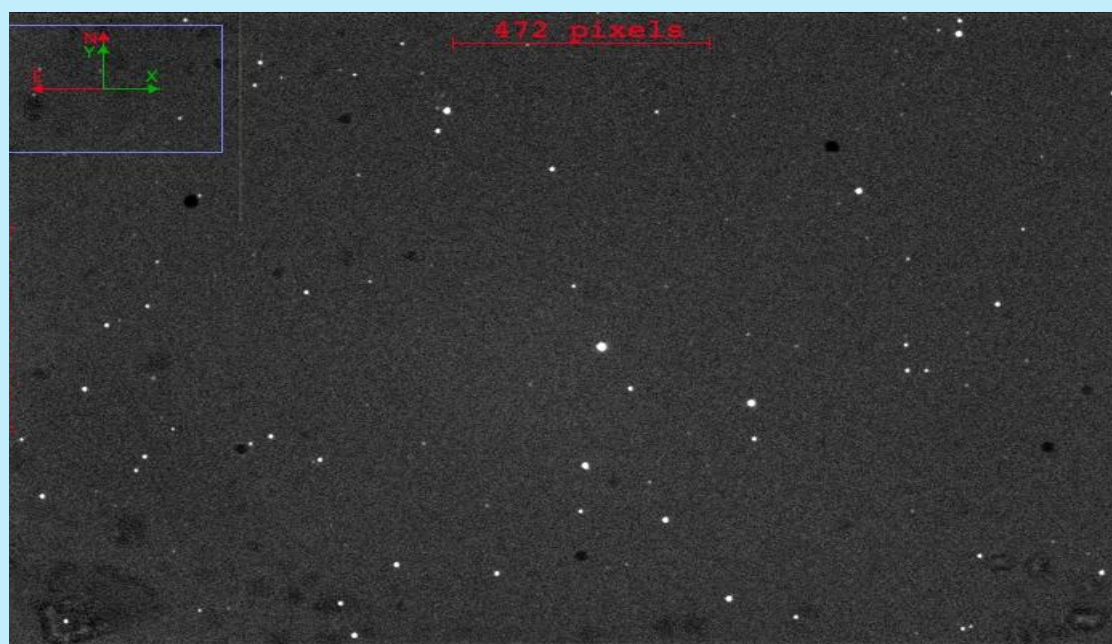


Figure 4 (above): Uncalibrated Image.
Figure 5 (below): Calibrated Image.

Conclusions

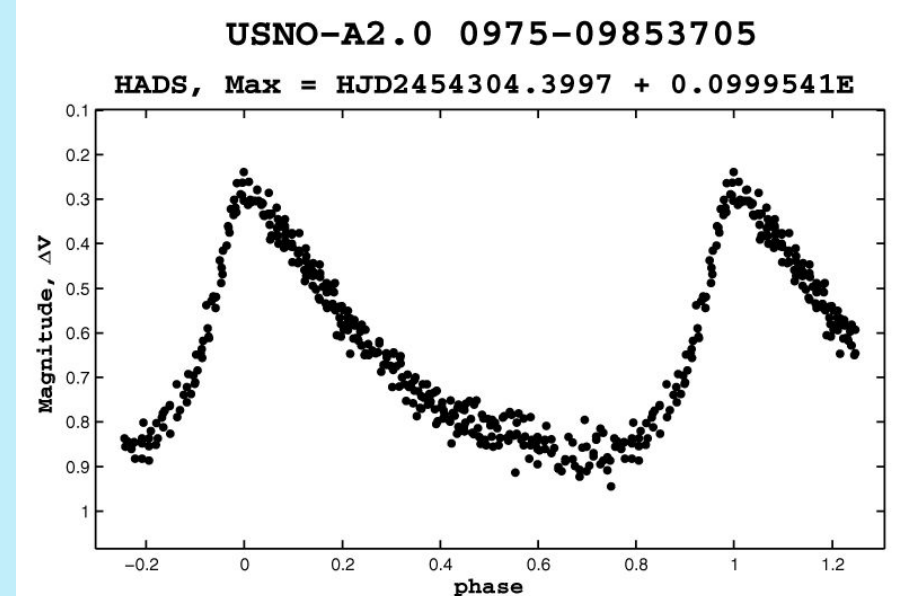


Figure 6: Approximate expected light-curve for a Delta Scuti star. Source: Antepin, S.V. et al. Peremennye Zvezdy (Variable Stars) 27, No. 8, 2007

We found that the light curve for SZ Lyn qualitatively matches the expected light curve for a Delta Scuti Star.