Title

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I. INTRODUCTION

II. DATA ACQUISITION AND SETUP

Observations were made on and at the Zaffarano Hall observation deck in Ames, Iowa (−93.647 34°, 42.029 96°, 342 m). Both nights had clear viewing and the ambient temperature was around 13 °C for the first viewing and 16 °C to 4 °C. The moon had little to no effect on our sight either night due to the target position being 107° away. Observations were made using a Meade 8" reflector telescope with a 2x focal length extender and an SBIG ST-402ME CCD camera with internal V, B, and I filters.

Setting up the telescope was the same as previous observations made with the 8" Meade telescope at Zaffarano Hall. was the trial night to determine whether DQ Cep would be visible and if the difference in magnitude could be seen.

A lot of time was spent locating the star of interest and orienting the camera. The method we found best for use with our specific Meade telescope was to slew to SAO 33047 and refernce a star chart to see where it sits in relation to DQ Cep and also SAO 33050. Now, slew to SAO 33050 and notice which direction the telescope slews. This will define polar axis in relation to the star chart. Then, we found similar triangle and were able to orient ourselves correctly on both axes compared to the star chart and then slewed to DQ Cep. Using the focal length extender was necessary to get both of our reference stars in the frame. This also depends on the orientation of the CCD, so we made sure to rotate the CCD on the mount so that all stars are in the image.

After focusing and determining our exposure time, we took 100 frames with 15 s exposures and a 10 s pause in between each frame. This pause is vital to allow realigning as the stars and mount fall out of alignment as the Earth rotates. In general we noticed about every 10 frames a small movement was necessary to keep all sources fully in frame.

The observations on were meant to gather as much data as possible. With a previously stated period of 0.0789 d (1.89 h)[2], we sought to get data over two full periods, so four hours of observations. One of us started observations around 8:00 pm and started taking 500 frames. At 10:00 pm we switched observers and ran until the end of the night. In all we gathered 483 science frames and 5 dark frames.

III. DATA ANALYSIS

Our data analysis pipeline has two major parts. The first is the differential photometry of all 583 frames and the second is using a Lomb-Scargle periodogram to determine the optimal period for fit.

For differential photometry we used AstroImageJ due to its ability to process large stacks of images. We used multi-aperture mode and set the reference magnitudes according to section I.

IV. RESULTS

V. CONCLUSIONS

ACKNOWLEDGEMENTS

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REFERENCES

[1]E. Høg, C. Fabricius, V. V. Makarov, S. Urban, T. Corbin, G. Wycoff, U. Bastian, P. Schwekendiek, and A. Wicenec. The Tycho-2 catalogue of the 2.5 million brightest stars. 355:L27–L30, March 2000.

[2]B. V. Kukarkin, P. N. Kholopov, Y. P. Pskovsky, Y. N. Efremov, N. P. Kukarkina, N. E. Kurochkin, and G. I. Medvedeva. The third edition containing information on 20437 variable stars discovered and designated till 1968. In *General Catalogue of Variable Stars, 3rd ed. (1971)*, 1971.

Appendix A: Observation Log

Appendix B: Analysis Scripts

Table I. Information about target and reference stars

Object	Type	RA	DEC	V	Ref
DQ Cep	*dS	20 57 48.6082	55°29′15.602″	7.40 to 7.48	[2]
HD 235411	*	20 57 31.1094	55°31′38.697″	9.76(3)	[1]
HD 200017	*	20 58 27.2026	55°39′0.459″	8.20(1)	[1]

Table II. Observed 27 September 2017 by Miles Lucas

Time	File	N Frames	Object	Filter	Exposure	Camera Temp.	Notes
0927/21:22	DqCep_V_15s_	100	DQ Cep	V	15 s	5 °C	

Table III. Observed 18 October 2017 by Miles Lucas and John Brandon

Time	File	N Frames	Object	Filter	Exposure	Camera Temp.	Notes
1018/20:15	DqCep_V_15s_	482	DQ Cep	V	15 s	5 °C	