

NOAO Observing Proposal *Standard proposal*
Date: October 4, 2015

Panel: *For office use.*
Category: Low Mass Stars

Photometry of δ Cephei

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Physics and Astronomy,
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Abstract of Scientific Justification *(will be made publicly available for accepted proposals):*

We will make optical photometric measurements of δ Cephei over the course of two weeks. The star is one of the closest classical Cepheid variables to Earth, with a period of approximately 5.37 days, meaning it will undergo 2.6 periods during the course of observation. Due to the incommensurability of the star's period with the Earth's day, our observations will be able to cover a large fraction of a full period. With these observations we will be able to perform Fourier analysis on the light curve and compare our results with those in the literature.

Summary of observing runs requested for this project

Run	Telescope	Instrument	No. Nights	Moon	Optimal months	Accept. months
1	CT-0.9m	CFIM + 2K	14	dark	May - Jun	Jun - Jul
2						
3						
4						
5						
6						

Scheduling constraints and non-usable dates *(up to four lines).*

Scientific Justification *Be sure to include overall significance to astronomy. For standard proposals limit text to one page with figures, captions and references on no more than two additional pages.*

Experimental Design Describe your overall observational program. How will these observations contribute toward the accomplishment of the goals outlined in the science justification? If you've requested long-term status, justify why this is necessary for successful completion of the science. (limit text to one page)

Proprietary Period: None

Use of Other Facilities or Resources (1) Describe how the proposed observations complement data from non-NOAO facilities. For each of these other facilities, indicate the nature of the observations (yours or those of others), and describe the importance of the observations proposed here in the context of the entire program. (2) Do you currently have a grant that would provide resources to support the data processing, analysis, and publication of the observations proposed here?"

Previous Use of NOAO Facilities List allocations of telescope time on facilities available through NOAO to the PI during the last 2 years for regular proposals, and at any time in the past for survey proposals (including participation of the PI as a Co-I on previous NOAO surveys), together with the current status of the data (cite publications where appropriate). Mark with an asterisk those allocations of time related to the current proposal. Please include original proposal semesters and ID numbers when available.

Observing Run Details for Run 1: CT-0.9m/CFIM + 2K

Technical Description Describe the observations to be made during this observing run. Justify the specific telescope, the number of nights, the instrument, and the lunar phase. List objects, coordinates, and magnitudes (or surface brightness, if appropriate) in the Target Tables section below (required for queue and Gemini runs).

The lunar phase should go from a half-moon on night 1, to a new moon, to a half-moon on night 14. An ideal time would be from June 27th to July 10th.

In calculating the needed exposure times, I have assumed the brightness is constantly its faintest (4.37 mag), a conservative airmass (14), a seeing of 10 arcseconds, and a constant lunar phase of a half moon. I give room to obtain an SNR of 500. Based on these results, I find that the necessary exposure times are 0.04 seconds for the V-band, and 0.02 seconds for the I-band. Allowing for some time to change filters, I estimate that we may take a burst of images for one filter every 5 minutes, and burst of images in *both* filters every 10 minutes. I will combine each burst of images into a single data point, meaning I will obtain 1 data point per band per 10 minutes.

I will be able to get approximately 7 hours of observing time each night, meaning I will get 42 data points in each band every night, and 588 over the course of the observing run, assuming no clouds.

Instrument Configuration

Filters:	Slit:	Fiber cable:
Grating/grism:	Multislit:	Corrector:
Order:	λ_{start} :	Collimator:
Cross disperser:	λ_{end} :	Atmos. disp. corr.:

R.A. range of principal targets (hours): 22 to 23

Dec. range of principal targets (degrees): 58 to 59

Special Instrument Requirements Describe briefly any special or non-standard usage of instrumentation.