

OBSERVING REQUEST
University of Arizona Observatories

Year: 2015

Term: Jan–Jul

Proposal type: education/outreach

Astr 302 Student Observing Project Time

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CoI(s): Betsy Green (SO)

Abstract of Scientific Justification

ASTR302 is the observational astronomy class for our undergraduate astronomy majors. This class presents the only observing related material in their curriculum. As such, it is imperative that this class involve at least some observing at a professional-grade observatory. We request four Friday-Saturday runs at the 61-inch telescope during Feb and March 2015 to accommodate the students in sufficiently small groups that they all have an opportunity to run part of the observing program. This type of activity has been a highly successful component of ASTR302 over the last few years.

We will use the 61inch's Mont4K imager for various student-defined (professor approved) programs. Likely the CMDs of several clusters and/or globulars will be obtained. Exoplanet transits, as well as some possible variable star work etc. The focus will be on student-acquired data that must be significantly post-detection processed to answer specific scientific questions. Only science driven observations will be approved for the runs. Thanks to Dr. Green help these projects have often been stepping stones towards full refereed publications and the start of many an astronomical career in the past.

Summary of observing runs requested for this project

Run	Telescope	Cage	Instrument	PI	AO	Nights	Moon	Scheduling		Sharing	
								Optimal	Acceptable	Poss.	Adv.
1	61	f/13.5	Mont4k			2	dark	Feb 20-21	Feb 20-21	no	no
2	61	f/13.5	Mont4k			2	grey	Feb 27-28	Feb 27-28	no	no
3	61	f/13.5	Mont4k			2	grey	Mar 13-14	Mar 13-14	no	no
4	61	f/13.5	Mont4k			2	grey	Mar 27-28	Mar 27-28	no	no

Scheduling constraints and unusable dates (up to 4 lines): The A302 nights always have some pretty tight constraints: 1) the runs have to be a Friday and a Saturday (so that the students do not have to miss class); 2) The projects need at least gray nights to be successful; 3) The nights need to be at least 8 weeks into the semester but no more than 3 weeks before the end of semester. We have avoid March break. Hence the above dates are the only combinations that work. Sorry for the lack flexibility. If you have questions please contact me.

no text past this line

A * appended to the proposal type indicates a continuation proposal; a * appended to the name of a proposer indicates the proposer is a (graduate) student; a proposer whose name is underlined is certified on the proposed telescope/instrument combination; if a * appears within the PI or AO box in the observations summary table, the instrument is a PI instrument and/or Adaptive Optics are requested – signatures are required on the next page.

Target list (attach list if longer than 26 objects)

#	Object	RA	Dec	mag / color / type / redshift / comment / etc.
1	To be determined by the student assignments/proposals			

Approval for Instrument Use from PI: _____
(have instrument PI signature appear on, or attach PI e-mail to, **all** copies)

Graduate students (provide the following information for **each** student named as PI or CoI on the cover page. Have the advisor's signature(s) appear on **all** submitted copies)

Student's Name	Advisor's Name	Advisor's Signature	2nd-yr	Thesis

Scientific Justification

What is the point of an "observational astronomy" class if the students never get to use a telescope? While the concepts of observing can be taught in the classroom, there is no substitute for actual hands-on experience, even when that experience is limited. Over the past few years the students (led carefully by Dr. Betsy Green) have been using the 61-inch telescope on Mt. Lemmon to obtain data that they subsequently analyze. This activity has been a key component of the course. Students have explicitly told me that this was the favorite part of the course (not just because it was fun, but because they were able to apply the concepts discussed in class). We propose to continue it this year for the spring ASTR 302 course with four Friday-Saturday runs.

We propose to use the 61-inch because it is the least subscribed of the major Steward telescopes and works quite well. Betsy Green has extensive experience with the telescope and instrument, as well as with teaching undergraduates how to use the system. We require Friday-Saturday runs so that the students are not forced to miss classes on a day following their observing. We request four such runs because the course typically has an enrollment between 15 and 25 students. With this level of enrollment, each night would have around a MAX of around 5 students per night. These numbers ensure that the students spend most of their time actively using the telescope rather than passively watching someone else use the telescope. We request time in Feb and March so that the students are familiar with the various concepts (e.g. how a CCD works, how a telescope works, IRAF, etc.).

These nights have had a great effect on inspiring our majors to go on to graduate school in astronomy (at least based on my personal interviews when I last taught the course a few years ago. Hence, Betsy and I look forward to using the 61 inch for 8 nights (four separate two night (Friday/Saturday) runs) to carry out this exciting "hands-on" class that Steward is almost uniquely privileged to offer to its majors.

I wish I had such an opportunity when I was an undergrad! I thank you for the TAC's continued support of our major's program.

Experimental Design & Technical Description *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. (up to one page)*

We will use the imager for various student-defined (professor approved) programs.

Likely the CMDs of several clusters and/or globulars will be obtained. As well as some possible variable star work etc. Likely some nice exoplanet transits as well.

In particular, I found time-series data (like observing the P modes of B subdwarfs) and mapping out extra-solar planetary transits works very well with the Mont4K in windowed down mode. We have proved in the 2007 and 2008 and 2014 seasons that just half a night allows the students to obtain a publishable quality dataset, since the 61inch is in the top of its class for time series analysis (big scope, fast sensitive CCD, autoguider, plus all night to look at one target field = some unique science opportunities!)

The focus will be on getting data that can be reduced to answer specific questions. Only science driven observations will be approved for the runs.

Summary of Time Requested and Awarded The TAC needs to understand the scope of this project — (1) tell us how many UAO nights you've already had for this project, how many you request this time, and (a good guess of) how many you need to complete the project; (2) if a substantial amount of observing for this project comes from non-UAO telescopes, tell us about that observing, and how the UAO part fits in; (3) if you are collaborating with people who have telescopes, especially if you are part of a large collaboration, tell us who is leading the project, and how UAO time and your participation fit in. (*up to one page*)

For the last few years ~4X2 night (Fri-Sat) runs have been allocated at the 61inch typically each spring when A302 has been taught. I suspect this will continue into the future with the TAC's support of the major's program.

Previous Use of Steward Facilities List ***all*** allocations of telescope time for the present project and allocations for other projects on facilities available through UAO during the past 2 years, together with the current status of the data (cite publications where appropriate). Mark those allocations related to the present proposal (i.e, precede text with `\related` command). (***up to one page***)

Dr. Betsy Green has been running these 4x2 night spring A302 runs for last few years. There is always a generation of nice data and results in this class from these runs.