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The ASTRA spectrophotometer:

July 2005 progress report

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Abstract. We report the current status of the ASTRA Spectrophotometer, present our future plans, and indicate that observing time will be available for collaborative studies.

Key words. Instrumentation: miscellaneous, spectrographs

1. Introduction

Instrumental projects have times when they are making good progress and times when they are not. In times of good progress one is optimistic about future deadlines and in times of slow progress one is not. Consider this report to be mildly optimistic. Our goal has been to get things right the first time,

The interpretation of optical region stellar spectrophotometer usually requires the use of stellar model atmospheres. We are building the first spectrophotometer in a long time designed for stellar studies.

Some basic information:

1. Resolution: 7 Å in second order and 14 Å in first order.
2. Wavelength range: $\lambda\lambda$3300-9000 (target range, will know more soon).
3. S/N $\geq$ 200 (after correction for instrumental errors) over the full range in less than a minutes for a 5th mag A0 V star. (The best absolute calibrations of Vega have errors $\geq$ 1%.)
4. Plan to use 10 min/hour to observe secondary standards.

2. Status

We hope to bring the spectrophotometer from Victoria, BC. Canada to Fairborn Observatory near Nogales, AZ this fall. Then the instrument

Send offprint requests to: S. J. Adelman will be mounted on the telescope and integration will begin. At that time Frank Younger and I will construct and install the flat fielding system.

Three to six months should suffice to integrate the spectrophotometer with the telescope, a process which will be done by Lou Boyd and Don Epand. Frank Younger, John Pazder, and I have tried to work closely with them on issues that will affect this stage. The instrument has three CCDs, one for science, one for finding, and one at zeroth order for guiding. Towards the end of this period we should begin to get observations. Our system for broading the stellar exposures by rocking the telescope in Declination needs to be checked.

The telescope RA and Declination drives are working. The mirror cell is finished and the optics have been aluminized. Fairborn Observatory is constructing the tube and will make the secondary mirror controls work. The telescope and instrument will have to be balanced.

The instrument is mostly assembled. All the optical parts and CCD cameras are in hand. The optical parts have been tested by the Dominion Astrophysical Observatory and found to have met their specifications. The light path to allow the light to fall upon the science CCD has been drilled through the optical plate. Some additional minor machining will be completed shortly before testing begins.

We will obtain test exposures for a wide variety of purposes. For example, to test the reduction of the exposures to one-dimensional spectra with CCDSPEC, Austin Gulliver needs some stellar exposures. We need to verify the wavelength scale and the sensitivities and to check the thermal performance of the instrument and the science CCD as this is a temperature controlled spectrophotometer, the first such instrument so controlled. The linearity of the science CCD needs to be confirmed.

Barry Smalley with some input from me has been working on the data entry and reduction management systems. He needs data to test how well the atmospheric extinction is removed and the method for obtaining the absolute calibration.

3. Collaborative Proposals

We will have a call for collaborative proposals once we have a semi-firm date for the beginning of science observations. For the first two years of scientific observations our major projects are 1) Revision and Extension of the Spectrophotometric Secondary Standards and 2) Sample Fuxes of Population I and II Stars. Our important auxiliary projects are 1) Comparisons with Model Atmospheres and 2) Synthetic Colors and Line Indices from Spectrophotometry We are interested in collaborations for aspects of these projects. We also have defined somewhat related projects such as optical region reddening. Eventually we would like to provide dereddened energy distributions.

A wide variety of projects can be done with spectrophotometry. We are particularly interested in fundamental stellar properties and in understanding important physical processes, such as convection.

Please contact one of the first three authors if you are interested in working on a [roject involving the data which will be obtained. We will send you a copy of our last progress report paper (Adelman et al. 2004) which has more details on the instrument and on collaboration and a copy of our recent Dear Colleagues letter.

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References

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