

THE PROCYON CAMPAIGN:

Observations from Kitt Peak

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Time series spectra of the F5IV star Procyon (α CMi) were obtained at the Kitt Peak National Observatory during a 35-night observing run in January-February 1997. The observations were obtained as part of an international collaboration to detect and study acoustic p-mode oscillations in solar-type stars. Spectra covered the wavelength range from 4000 to 5300 Å, with a resolving power of approximately 3500 (1.3 Å resolution). The sampling rate was one observation per minute, and the typical S/N ratio per pixel after averaging along columns is in excess of 1000. We obtained 12,888 spectra. A sample spectrum is shown in Figure 1

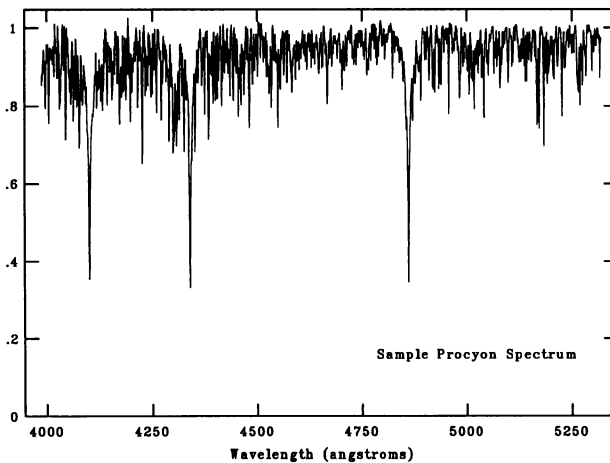


Figure 1. Sample Spectrum of Procyon

In Figure 2, we show the time distribution of the data during the 35-night run. Each point is plotted to show the signal level (in ADU in a single line of the image)

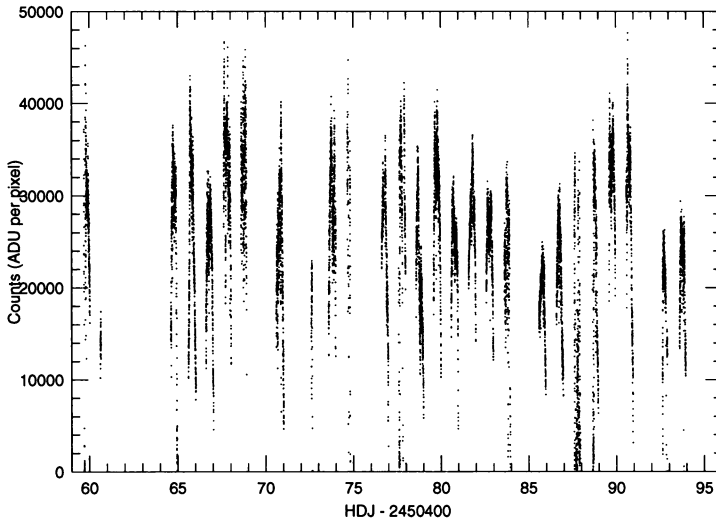


Figure 2. Observations of Procyon

per pixel in the continuum. During the 35-night run, we obtained 24 lengthy time series (longer than 5 hours), and a few shorter series.

The spectra are being analyzed to identify any periodic signals due to acoustic oscillations in Procyon. In addition to measuring the equivalent widths of the three Balmer lines covered by our spectra (H-beta, H-gamma, and H-delta) we will also examine the spectra for variations in the average metal line strength.

Reductions of the data are complete, and the equivalent widths of the Balmer lines have been measured. Preliminary analysis of the full time series is underway. We will also average the power spectra determined from each individual night's data. The frequencies of the expected p-mode oscillations have been predicted by Chaboyer et al. (1997) from a new grid of stellar evolution models for Procyon based on the revised astrometric mass of Girard et al. (1996). These models suggest that p-mode oscillations of Procyon should occur at frequencies near $1100 \mu\text{Hz}$, with frequency splittings of $54 \mu\text{Hz}$.

References:

- B. Chaboyer, P. Demarque, and D. B. Guenther, presented at "A Half Century of Stellar Pulsation Interpretations: A Tribute to Arthur N. Cox," A.S.P. Conf. Series (in press)
- T. Girard, H. Wu, J. T. Lee, S. E. Dyson, E. P. Horch, W. F. van Altena, C. Ftaclas, R. L. Gilliland, K. G. Schaefer, and H. E. Bond 1996, BAAS, 28, 919