

A New Ford/ Photometrics CCD

General Characteristics: This fall CFHT received a new CCD manufactured jointly by Ford Aerospace and Photometrics LTD. This chip, known as PHX1, has 20x20 micron pixels arranged in a 516x516 array and is front-side illuminated. To enhance the blue response of the device, Photometrics has deposited a special coating on the imaging surface (Metachrome-II) that extends the CCD's sensitivity to below 3000 Angstroms. Lab tests conducted at CFHT have shown this device to be free of cosmetic defects and physically quite flat. Several outstanding features have been observed in this device. First, the amplifier is capable of very low noise operation. With a gain setting of 2.3 e⁻/ADCU, a noise level of about 7.1 electrons has been measured. Secondly, the charge-transfer efficiency of this chip is so good that no pre-flash is required.

Excellent CTE: Even in images at the 20 electron-level charge-transfer is quite good, yielding very sharp images. Figure 6a is a bias-subtracted, low-light-level frame of a test target. The columns located inside the white box have been averaged and plotted in Figure 6b. In this image intensities range from about 18 electrons for the bright areas to around 7 electrons in the dark regions. The target pattern is still quite clear, while the plot shows the bar-pattern well resolved. The detector is operated at -120° C.

Smaller Dewar: To reduce weight and length, this CCD is mounted in a shorter dewar. Although the new dewar is about two-thirds the length of older CFHT CCD dewars (such as RCA 2), it has been designed for a minimum hold time of 12 hours. Thus, with its optimized size and weight, this dewar should work well in instruments concerned with dewar flexure and limited detector space.

Applications: PHX1 will be well suited in applications requiring very low read noise and excellent charge transfer. Applications such as spectroscopy may well find the low noise and sharp images generated by this CCD perfect for the study of weak spectral features. Also, where time resolution is not important, PHX1 may be used for projects requiring photon counting. Overall, it appears that this device will be very valuable in projects that currently employ low noise detectors such as the Thompson-CSF (TH1) CCD.

Sky Tests: In mid January PHX1 will be mounted at prime focus for a trial imaging run. It is also planned that in April the detector will be used on the Herzberg spectrograph. Since Ford Aerospace has recently begun packaging their 2048x2048 arrays, it is important for us to gain more experience with PHX1 and understand its merits and limitations.

Chris Clark

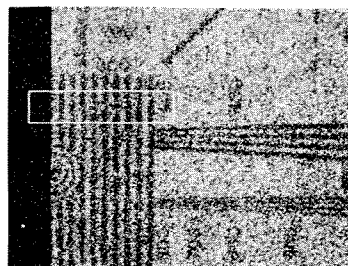


Figure 6a

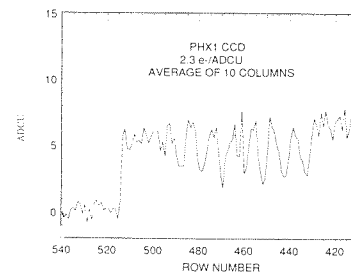


Figure 6b

Status Of New Data Acquisition Software

Our primary activity this last semester was in converting previously commissioned instruments over to our new computers. As mentioned in our last report, the HP-1000's are being phased out. In this regard, no new development work was scheduled for the HP-1000's. While we are still in a transition period, most of the tools, standards and techniques are now in place on the new machines.

We are taking advantage of many industry standards such as X-Windows, networking and UNIX. Additionally IRAF is now available at the summit. This has allowed for some very sophisticated observing sequences. We have also been striving to develop and install this new collection of technologies as a flexible system which can be used for all of the quite different types of sciences performed at CFHT.

The basic user environment is in use and many of our applications are up and running. In fact, all CCD activity is now on the new machines. The HP-1000 CCD technology

has been decommissioned and dismantled and the IVAS image display system has been sold.

Instruments now released on the new computers include:

- UVPrime: complete instrument control, including automatic wavelength calibration software.
- Herzberg: only the CCD is controlled by the new machines, the spectrograph itself is at this time still controlled by the HP-1000.
- MOS/PUMA: provides for object selection and punch machine control.
- FOCAM: complete instrument control.
- VHR: the VHR instrumentation is controlled by its own computer, while the CCD is controlled by the new machines.

FTS, Reticon and the rest of the Herzberg will continue as high priority projects for first semester 1989. Note that porting/rewriting the InSb and TV Photon Counting software may not be a good use of manpower and is not currently scheduled.

Jon Brewster