

The Marseille-CFHT Focal Reducer with a PUMA Mode in General Use

A new focal reducer, on lease from the Observatoire de Marseille, is now available in general use at CFHT for the next three years. It is better adapted to spectrographic uses than the CFHT "Palila" focal reducer because:

- a) its chromatic aberrations, especially in the blue, are smaller
- b) it does not correct the comatic aberration at the F/8 Cassegrain focus of the telescope (and hence does not give comatic images of a slit)

It uses either a F/2.25 or a F/3 camera on the 45mm diameter exit pupil, and any of the present CFHT CCD detectors.

Carpenter grisms are used to get spectra. We have presently two such grisms: B400, centered at 5200Å and giving a dispersion of 230 Å/mm for the 100mm F/2.25 camera; O600, centered at 6000 Å and giving a dispersion of 160 Å/mm at f/2.25.

The useful spectral range is approximately 4000 Å to 7500 Å. Monochromatic images are very good over the whole 75mm diameter field (8.5 arc min diameter) at F/8. Chromatic aberrations, however, are still too large for a perfect focussing at 5500 Å, they give a transverse blur of 100μ diameter at the two edges of the spectral range. A new dedicated collimator is being ordered and it is expected that this aberration will be eliminated by early 1989.

The instrument uses under computer control a four position filter wheel (75m diameter filters) and a four position grism wheel: two positions receive GRISMS, the two others are open. A calibration box contains two spectral lamps (usually Ne and Ar) and a continuum lamp for flat fielding and slit/mask positioning.

The only presently commissioned use is the multi-holes PUMA mode:

It uses a Mark I punching machine, initially developed by an Observatoire de Toulouse team as a visitor instrument. A computer controlled routine selects ~15 to 40 objects from a direct CCD frame (without dispersion). This coordinate file is used to punch holes or slits 300 μm in width (2"2 on the sky) on a thin metallic wafer, which is placed by hand in the telescope focal plane. An additional CCD image of the backlit mask is then used to get a very precise alignment (± 0.1) between the hole and the objects. The whole procedure lasts ~ 20 minutes (see Fort et al., SPIE proceeding vol. 627, 1986 for details). Using the TH1 CCD, it should be possible to obtain spectra S/N ratios in the continuum of 10 for $M_R=21.5$ objects in 3 exposures, each 1.5 hr long.

A long slit mode will shortly be tested, and hopefully be commissioned for the second semester 1989. It presently uses a 40mm long (5 arc min) variable width slit. A "video game" technique will be used to put the object on the slit with a very good accuracy.

This focal reducer also has an integral field capability but, at present, is only a "visitor" mode (Observatoire de Marseille and Observatoire de Lyon). In this mode, referred to as 'TIGER', ~ 60 spectra for each 0.7 arcsec pixel are produced in a field with dimensions of roughly 4x6 arcsec. Spectral dispersion is the same as in the other, more classical, modes.

Operation of the instrument is fully computer controlled (except for initial adjustment, positioning of the PUMA mask and opening of the slit). Potential observers are nevertheless warned that the operation is still quite complex. Dedicated macros are being written however e.g. for focusing, offset pointing, calibration procedures and considerable progress is expected in the next two years

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General Availability of the CIRCUS IR Camera

Interest in infrared imaging with array cameras is increasing rapidly within the CFHT community. Two team instruments from France have already had successful runs at CFHT: Obs. de Lyon 32x32 HgCdTe and Obs. de Paris-Meudon 32x32 InSb (CIRCUS). The University of Rochester 58x62 InSb array will have a four night run in July, and CIRCUS will return for its third run at CFHT in November (11 nights). In fact, of all the instruments to be used at CFHT this semester, only three (coudé spectrograph, CCD's for imaging, FTS) will be used more than IR cameras!

The CIRCUS camera (Caméra Infra-Rouge à Courtes longueurs d'ondes pour Utilisation au Sol) has been developed by the Département de Recherches Spatiales (DESPA) of l'Observatoire de Paris-Meudon. The team responsible for the project is headed by Daniel Rouan. The camera uses a 32x32 InSb array with a CID readout. More details on CIRCUS and an account of its first run at CFHT can be found in the previous issue of the Bulletin (No. 18, 1988 First Semester). The basic characteristics of the camera are recapitulated in the table below.

One year ago CIRCUS was made available to the French community as a common-user instrument. Support for observing runs was provided by the DESPA team under an agreement with INSU. The team have now very generously offered to make the camera available to all three CFHT communities beginning in first semester 1989. Observers wishing to use CIRCUS are invited to submit proposals in the usual manner. Those planning to do so are asked to contact