due to the intermediate phosphor stage: this property makes the EBCCD tube quasi perfectly quantum noise limited, without any temporal constraints in the number of photons per time unit.

The limited photon noise is of great importance for the optimization of the modal control scheme currently being implemented in COME ON PLUS. In particular, it will allow to decorrelate the number of modes corrected by the deformable mirror from the number of subapertures needed for the wavefront measurement. This number of subapertures is kept fixed, whatever the observing conditions are, even for very low signal-to-noise ratio. A programmable integration time (2.5 to 40 ms) is provided in order to cope with low flux levels.

The first performance tests under real observing conditions with the EBCCD integrated in the upgraded COME ON PLUS system are planned for September/October 1992.

A New Cross Disperser for CASPEC

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1. Introduction

In an earlier report about the upgrading of CASPEC, the Cassegrain Echelle Spectrograph attached at the 3.6-m telescope, the future installation of a new RED cross disperser was announced (Pasquini and Gilliotte, 1991).

The main reason for the need of a RED cross disperser was that the overall CASPEC capabilities at wavelengths longer than ~600 nm were rather poor, despite the good efficiency of the Tektronix chip at these wavelengths (CCD # 16). Because the principal cause of poor efficiency was the low response of the standard (hereafter BLUE) cross disperser, a new grating was acquired having the peak efficiency in the red part of the spectrum.

The cross disperser for CASPEC is formed by a mosaic of two gratings; they were assembled and aligned in Garching and the mosaic arrived at La Silla at the end of 1991. The characteristics of the cross disperser are given in Table 1 and its efficiency curve is shown in Figure 1.

Due to problems occurred during the Garching–La Silla transfer, it was necessary to re-install the cross disperser in its support at La Silla and at the beginning of January the mosaic was successfully mounted and tested on CASPEC with the Short Camera.

2. Performance

The optical quality of the grating is very good, and the spectra are free of ghosts and internal reflections.

Table 1: *Characteristics of the red cross disperser grating*

Groove density	158/mm
Blaze wavelength	800 nm
Blaze angle	3°38′

The instrument configuration is rather stable. In particular the counterweight system, which is similar to that used with the BLUE cross disperser, was found to work properly.

The spectral range covered in one frame is large, about 280 nm with the Tektronix CCD actually mounted on CASPEC. This of course implies that the order separation is rather small (about a factor 2 smaller than with the BLUE cross disperser). The order separation as a function of the order number is given in Figure 2. For wavelengths below 550 nm this separation is less than about 6 arcseconds (the spatial scale with the short camera is of 24 arcsec/mm in the direction perpendicular to the dispersion).

This implies that below ~550 nm the RED cross disperser can be hardly used, and that only with a very short slit can order confusion be avoided. As a consequence, *for observing programmes which require BLUE and RED spectra in the same night the RED cross disperser is not suitable.* The small interorder space must be taken into account also for all applications requiring a proper sky subtraction.

As expected, the CASPEC efficiency in the red is greatly enhanced: the efficiency of the Short Camera + RED Cross disperser + CCD 16 has been measured through observations of standard stars and is given in Figure 3 (filled triangles).

During the same test run the efficiency of the Short Camera + BLUE cross disperser + CCD 16 was also measured,

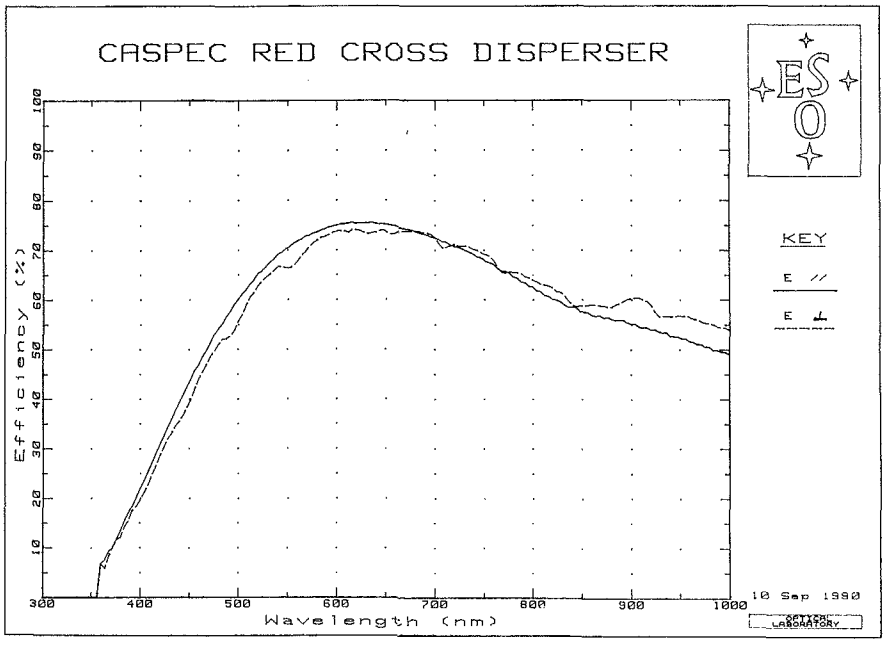

Figure 1: *Efficiency curves for the RED cross disperser for polarization parallel and perpendicular to the grooves.*

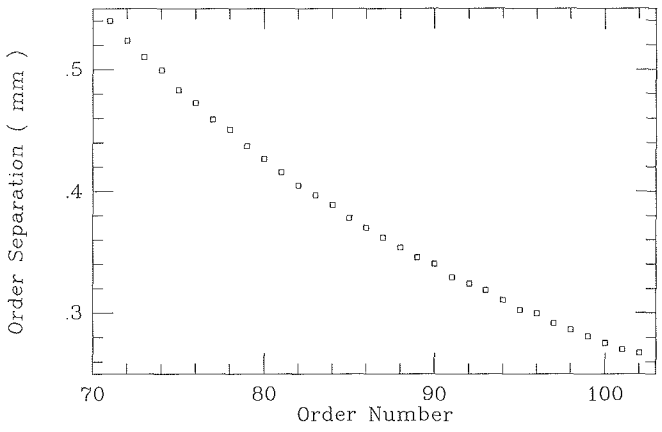

Figure 2: *Interorder separation (in mm) vs. order number for CASPEC + short camera + 31.6 lines/mm echelle and RED cross disperser.*

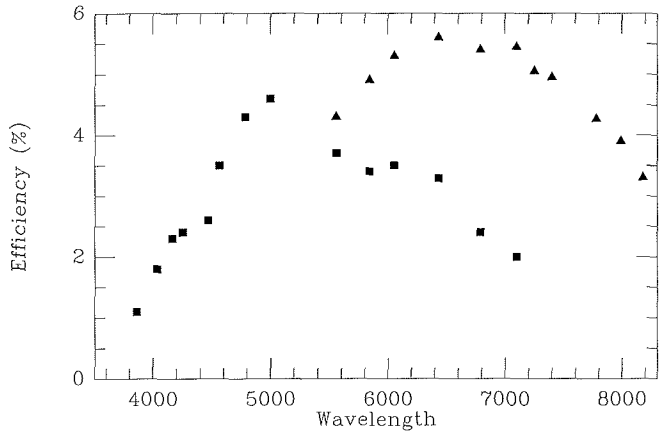

Figure 3: *Overall efficiency curve including 3.6-m telescope + CASPEC (short camera and 31.6 lines/mm echelle) + CCD 16; filled triangles: RED cross disperser; filled squares: BLUE cross disperser.*

and the results are also given in Figure 3 (filled squares). The dramatic improvement due to the use of the RED cross disperser is easily recognizable.

We note that the efficiency curve of CASPEC and the BLUE cross disperser is higher than that given in Pasquini and Gilliotte (1991); this is due to two factors:

(1) The CCD was UV flooded.

(2) The procedure previously used tended to underestimate the efficiency at blue wavelengths.

3. Practical Hints

A few comments are necessary regarding the practical use of this new configuration:

(1) There is no order overlap at wavelengths longer than ~815 nm.

(2) A colour filter (CASPEC colour filter 2 or 1, according to the chosen spectral range) must be used in order to avoid second-order contamination, *both* in the calibration spectra *and* in the scientific exposures.

(3) If requested, the RED cross disperser will be mounted and it can be considered officially offered, but potential users should note that the *change of cross disperser in the course of the night is not allowed.*

References

Pasquini, L., Gilliotte, A. 1991: *The Messenger*, **65**, 50.

News About Imaging Filters

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ESO is actually offering different sets of image quality filters which can be used on all imaging instruments at La Silla. Filter sets exist in different copies, of which only one is reserved at one instrument. A basic filter set includes the Bessel (U, B, V, R, I), Gunn (g, r, i, z) and four interferential (Hα, Hαr, SII, OIII) filters. Other filters are also available with a lower number of copies; they can be used only on one imaging instrument. Filters have now an external diameter of 60 mm and a maximum thickness of 10 mm. They are mounted on a metallic ring for easy manipulation. ESO offers around 200 image quality filters.

Since November 1991, a new image quality filter list is available at La Silla. Access of data can be obtained directly with the help of a new programme developed here under MIDAS.

Filter parameters and curves can be obtained with simple softkey menus. The programme is accessible with Sun stations under MIDAS with the command SET/CONTEXT FILTERS. Filter list, search, plot, overplot are also possible with laser hardcopy facilities.

All available image quality filters have been measured according to two sets of parameters. The first concerns the spectral performances as central and peak wavelengths, the full width at half maximum bandwidths, the peak transmission and the eventual red-leak. Quality performance is also indicated in terms of eventual image deformations as elongation, blurr effect and the eventual presence of ghost images. Ghost images can be disturbing even with a relative intensity difference of 10^4 with the main image.

All filters will soon be checked again, especially concerning the red-leak blocking performances with the help of a new powerful spectrophotometer recently purchased.

The image quality filter database will be constantly updated with the new filters or with eventual filter removing after damages.

MIDAS Memo

ESO Image Processing Group

Most information concerning MIDAS is now published in the *ESO-MIDAS Courier* which was introduced in 1991 as a newsletter for the MIDAS users community. The MIDAS Memo is therefore no longer required and will be discontinued as a regular column. The Image Processing Group will still announce new major developments in the *Messenger* but it will happen only when called for e.g. at major new releases of MIDAS.