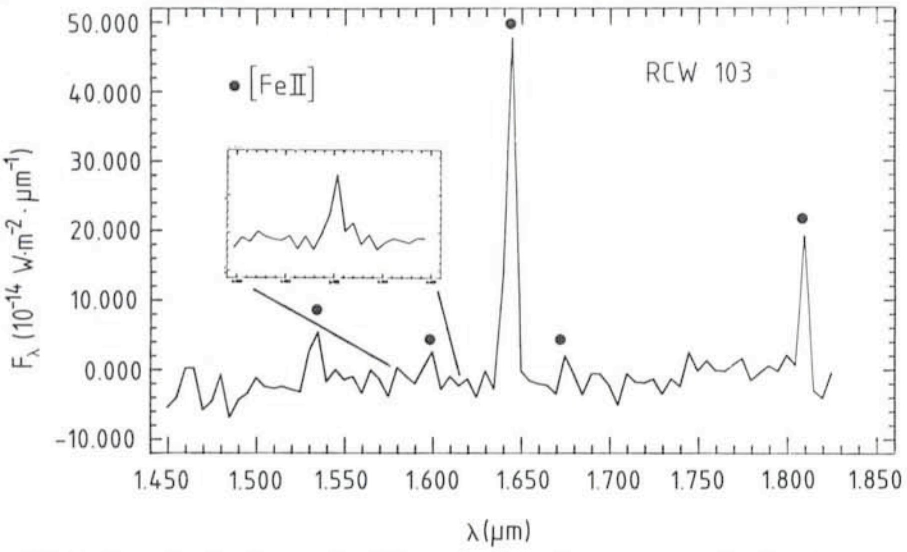

Figure 3: *An H band spectrum on the position of peak [Fe II] (1.644 μm) emission in RCW 103 (white in Fig. 2). Several other [Fe II] lines are present including one at 1.60 μm whose intensity relative to the 1.644 μm line is density sensitive. The insert spectrum shows a better measurement of this line made with a longer integration time.*

Leibowitz and Danziger (1983) based on optical [S II] lines and the Balmer decrement.

In addition to [Fe II], lines of H I (Brγ at 2.165 μm) and H_2 (1–0 S(1) at 2.12 μm) have also been detected in RCW 103 at 2% and 6% respectively of the 1.644 μm line intensity. To our knowledge, H_2 has only been detected previously in IC 443 which is known to be associated with a molecular cloud (Treffers, 1979). From the 1.644/Brγ ratio we derive $Fe^+/H^+ \simeq 5.10^{-5}$ assuming a Case B recombination hydrogen spectrum. Further interpretation of this quantity is model dependent due to the unknown ionization structure. Simple models however give $Fe^+ \simeq Fe$ and $H^+ \leq 0.1\,H$ implying $Fe/H \leq 5.10^{-6}$ or a depletion factor of > 0.8 for Fe and hence relatively little grain destruction. Of great interest in the future therefore is to see how this ratio varies from remnant to remnant.

We consider these first results to be encouraging both from the point of view of demonstrating the detectability of useful infrared lines and as an observational test of the available Fe^+ atomic data. Further attempts to exploit their astrophysical potential are clearly warranted as is their inclusion in future theoretical shock models.

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NEWS ON ESO INSTRUMENTATION

F/35 Infrared Photometer at the 2.2-m Telescope

An infrared system consisting of an infrared photometer/adaptor, detector units and an F/35 chopping secondary mirror was installed and tested on the 2.2-m telescope in March 1987 in a collaboration with Heidelberg's Max-Planck-Institut für Astronomie.

MPIA developed and built the chopping mirror and its associated functions for focus and rotation. As can be seen in Figure 1, this infrared secondary is mounted in the original Coudé ring and, therefore, a change from visible (F/8) to infrared (F/35) observing requires a change of toprings.

The infrared photometer is a duplicate of that at the 3.6-m telescope, as described in the *Messenger* No. 39 by A. Moorwood and A. van Dijsseldonk. It is equipped at present with bolometer and InSb detector units which are basically identical to those offered at the 1-m and 3.6-m telescopes.

This new instrument has been offered

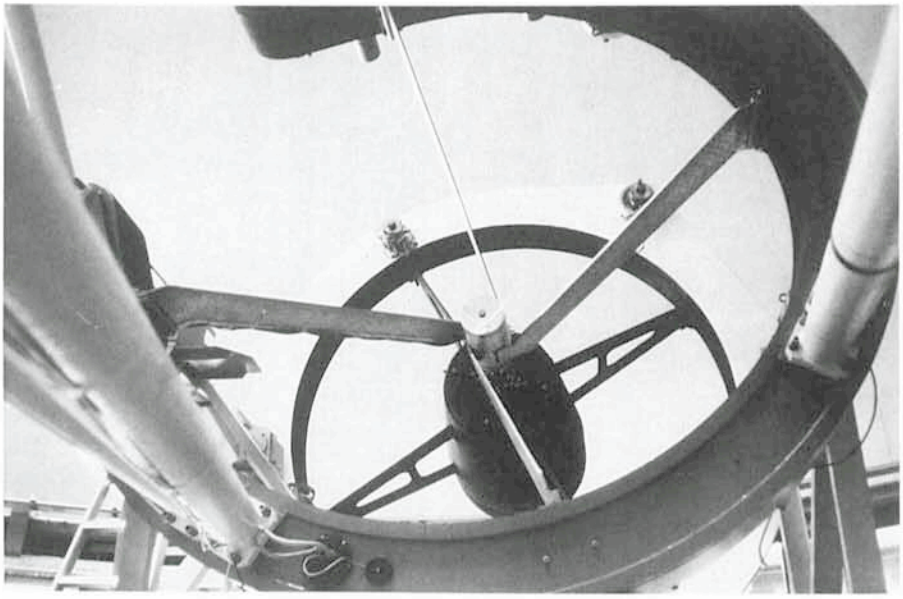

Figure 1: *F/35 infrared chopping secondary mirror mounted on the 2.2-m telescope. The mirror is only 21 cm in diameter. Behind is the "normal" F/8 front ring which has just been exchanged with the coudé ring used to support the infrared secondary.*

to visiting astronomers as of October this year. Preliminary limiting magnitudes (1 σ in 30 minutes integration time through a 7.″5 diameter diaphragm) are given in the table.

These limits are consistent with those achieved at the 3.6-m telescope, after scaling for the difference in telescope diameters, except at $\lambda \geqslant 10\ \mu m$ where the only measurements possible at the 2.2-m were affected by thin cloud.

Band	J	H	K	L	M	N	Q
Centre wavelength (μm)	1.25	1.65	2.2	3.8	4.8	10.3	18.6
Limiting magnitude	19.6	19.3	18.4	13.8	11.0	6.8	3.3

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Progress Report on DISCO: A Project for Image Stabilization at the 2.2-m Telescope

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1. Introduction

It is well known that the resolution of earth-bound large telescopes is normally limited by the atmosphere, and not by diffraction. The astronomical image formed by a large telescope consists of a number of speckles, caused by the atmospheric refractive index variations. Every speckle is defined by a coherence zone over the pupil of size r_o, also known as the seeing parameter. These coherence zones cause a blurring of the image and also a motion of the centre of gravity of all the speckles. In addition, image motion can have local origins (dome seeing, tracking and guiding errors). As a result, short-time exposures, where the motion is frozen, may have a higher resolution than long exposures.

Until recently, little was known experimentally about the temporal behaviour of image motion. A theoretical model, originally proposed by Kolmogorov, describes the decrease of the power spectrum of image motion with temporal frequency[1]. Recently, experimental data on power spectra of image motion have been published in the context of site testing[2] and speckle interferometry[3]. In cases of good seeing, which we define somewhat arbitrarily as $r_o \geq 15 cm \Rightarrow$ FWHM = 0.7″, the frequency dependence of the power spectra was indeed observed[2] (if the seeing is bad, the number of speckles is too large and image motion is averaged out). A typical time constant of the image motion is estimated from these data as 200 msec. Under such conditions, an imaging facility which corrects the image motion may improve the resolution of long integrations. Such a device is presently under construction at ESO for the 2.2-m telescope, and it is called DISCO, acronym for Direct Image Stabilized Camera Option. A similar stabilizer has been operating at the 2.2-m telescope of the University of Hawaii for some time[4]. The main task of DISCO will be to enable the observer in case of good seeing to switch within few minutes from "normal" exposures at the Cassegrain focus of the telescope f/8, (image scale of 0.35″/pixel for a RCA CCD) to stabilized exposures with 0.14″/pixel. The possibility of a quick changeover in the observation mode is considered an advantage, since periods of good seeing might be limited to a fraction of the night and in any case

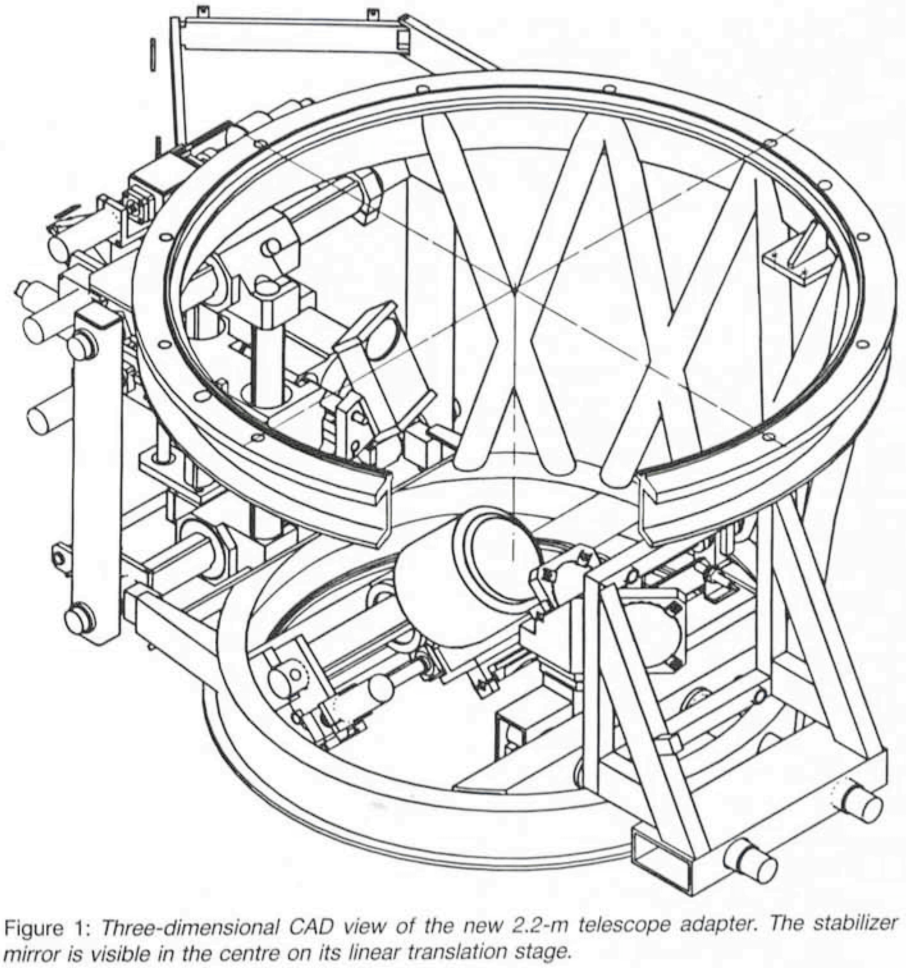

Figure 1: *Three-dimensional CAD view of the new 2.2-m telescope adapter. The stabilizer mirror is visible in the centre on its linear translation stage.*