No. 64, p. 59) ESO is organizing a workshop focussed on High-Resolution Spectroscopy with the VLT. We expect that the scientific objectives in this area of research and the different technical concepts will be thoroughly reviewed and discussed, opening the way for a decision later in the year.

3. Upgrading the VLT Instrumentation Plan

By the end of 1992, seven instrument projects (with two of them foreseeing the manufacture of a replica) will be in various stages of development. The remaining three will be in a definition phase. The entire VLT programme will then be far advanced and detailed information will be available on cost, schedule and foreseen performance. The time will then be ripe for a critical review of the entire instrumentation plan, an assessment of the resources still available and decisions on additional instruments.

The VLT Adaptive Optics Programme

From April 24 to May 5, 1991, the current configuration of the COME-ON adaptive optics prototype system for the VLT had its last test run before it returned to Europe for a major upgrade.

This 11-night run was devoted to technical tests for adaptive optics and scientific observations. The COME-ON system worked all the time fully reliably and no technical problems occurred. During the run the seeing conditions ranged from excellent to mediocre, and three nights suffered from bad weather conditions.

The technical part of the programme included tests of improved and new software, observations with partial correction at visible wavelengths, and recording of wavefront sequences.

Software with specialized routines depending on the available photon flux allowed an increase of servo-loop bandwidth from 10 to 25 Hz in connection with the intensified Reticon and the electron-bombarded CCD (EBCCD). With the higher bandwidth and improved modal control scheme the diffraction limit of 0.13 arcsec was reached even in the K-Band under good seeing conditions.

In view of partial correction by adaptive optics for speckle and long baseline interferometry, partially corrected images in the visible wavelength range were recorded with an intensified CCD. These recordings will allow a detailed analysis of the image profiles and verification of theoretical predictions for short- and long-exposure images. For these measurements an optical path was installed parallel to the IR camera.

The recorded wavefront sequences will allow to explore the spatial and temporal behaviour of the turbulence-induced atmosperic perturbations and comparisons with the theory of the turbulence.

The scientific objectives of this run included the environment of young stellar objects, asteroids and planets, the search of the potential third component of Sirius A, and luminous blue variables. From the young stellar objects, S CrA is of particular interest. It shows a clear

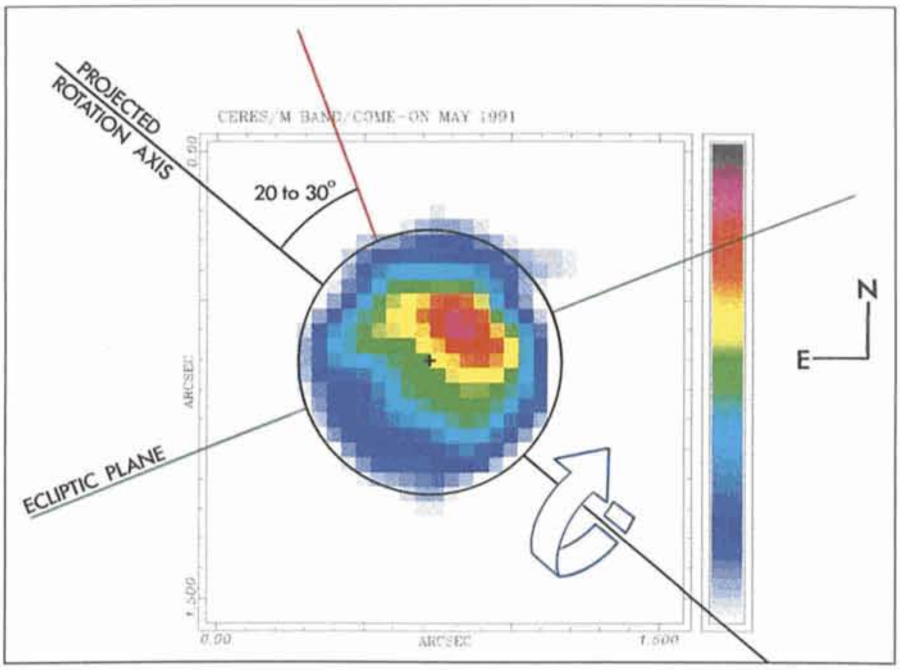

Figure 1: *One of the most impressive results with adaptive optics is the first direct determination of the rotation axis of an asteroid. Ceres was observed on May 5, 1991 with the 3.6-m telescope, using "COME-ON", and a 32×32 IR camera (Meudon). The data are still under reduction. The image shows Ceres at M (4.7 microns). At this wavelength, the reflected solar flux is negligible compared to the thermic emission of the asteroid's surface. Previous speckle observations, confirmed by photometric curves, show that the albedo is constant over the surface. The emission gradient along the S-E/N-W direction is then interpreted as a thermic lag effect of the surface soil, heated by the sun as the asteroid rotates. The rotation axis is found to be inclined 20–30 degrees to the ecliptic pole direction. Courtesy of O. Saint-Pé and M. Combes (Meudon Obs.)*

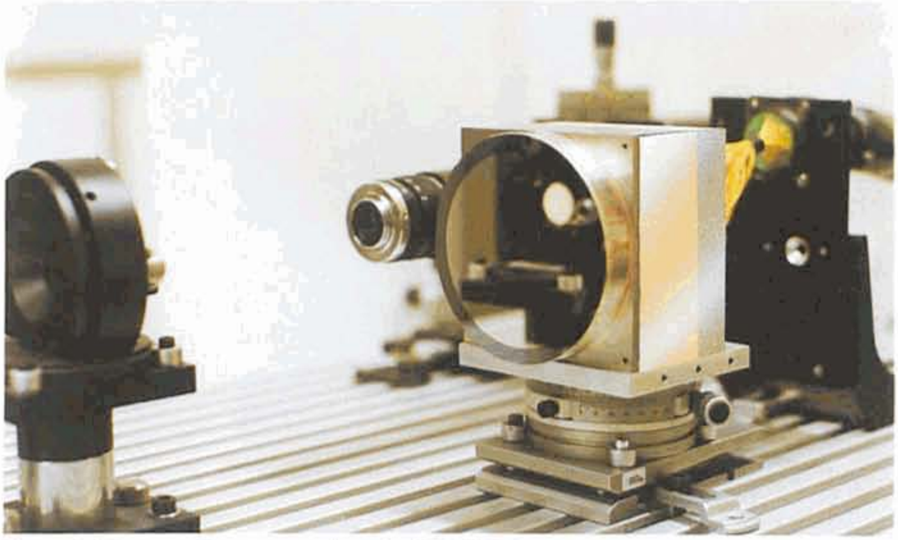

Figure 2: *The new 52-actuator mirror for COME-ON+ during tests at the laboratory of the manufacturer.*

extension. The observations of the asteroid Ceres were exciting and allowed to deduce the rotation axis of that famous small member of our planetary system (see Fig. 1).

Eta Carinae was observed with a CVF and a polarizer. In the K-band, one can recognize hints of the objects observed in the visible range by speckle interferometry, which have a distance of about 0.15 arcsec from the central star. All the scientific observations require a careful data reduction and analysis. The results will be published in the near future.

Immediately after the run the COME-ON system was shipped back to Europe for a major upgrade (COME-ON +). This work will be done at Observatoire de Paris-Meudon under the direction of ONERA. The upgrades include a new deformable mirror from LASERDOT with 52 actuators (see Fig. 2), an improved wavefront sensor and EBCCD provided by LEP (Philips), a faster and more powerful control computer, and some improvements of the passive optical and mechanical components. The upgraded system is scheduled to be back at La Silla in July 1992.

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A Report on the SEST Users Meeting and Workshop on Millimetre-Wave Interferometry

22–23 May 1991

The second SEST Users Meeting was held at ESO Garching on Wednesday, 22 May, the first having been held last year at Onsala. In view of the decision to develop the Paranal area for the VLT, it was felt timely to discuss the possibility of a millimetre-wave array in the southern hemisphere, and a workshop on this subject was held on the day following the Users meeting. The combination of these two meetings was obviously popular, as over 60 persons attended.

The SEST Users Meeting

The Users meeting commenced with a number of short reviews illustrating some of the recent scientific results from SEST: The Magellanic Clouds Key Programme (F. Israel and J. Lequeux), CO Rotation Curves of Galaxies (R. Wielebinski), CO in Centaurus A (A. Eckart), Spectral Scans of Sgr B2 (A. Hjalmarsson), Observations of Planetary Nebulae (R. Sahai), and A CO Survey of IRAS Stars (L.-A. Nyman).

These were followed by talks and discussion covering all aspects of the operation and performance of SEST. R. Booth summarized recent developments and future plans, and L.-A. Nyman, N. Whyborn, E. Kreysa, and M. Olberg reviewed specific technical areas, including pointing, holography, receivers (heterodyne and bolometer), spectrometers, observations, calibration, and data reduction. Some of the main discussion points are summarized below.

Telescope pointing remains a matter of concern, and efforts to improve it were outlined. Inclinometers placed on the horizontal part of the fork above the azimuth bearing showed a temperature dependent tilt of the telescope axis amounting to a daily variation of about 6″. First attempts to improve the pointing by including the inclinometer data in the pointing solution are disappointing, giving an improvement in the rms error of only 0.7″. However, these results are very preliminary. The overall pointing rms is still about 3″ in both coordinates. The interferometer telescopes at IRAM show similar axis tilts, so the problem is apparently inherent in the design.

The surface accuracy is another area of concern. Holographic measurements of the SEST reflector surface and its subsequent adjustment led to a significant improvement in the profile (rms 60 micron). However, a subsequent readjustment has increased the error again to around 75 micron. Unfortunately the satellite which has been used as a beacon for the holography measure-

Snow on La Silla!

Heavy snowfall on June 18, 1991 transformed the La Silla Observatory for a few days into a winter landscape. The above photographs were taken on June 20 by Erich Schumann.