cedented distances, promising real progress in clarifying the extragalactic distance scale. As an example we note that Planetary Nebulae should be observable with FORS not only in the Virgo and Centaurus clusters but also at the distance of the "Great Attractor" region of enhanced galaxy densities.

The FORSes will also be excellent instruments for spectroscopic surveys of (field) galaxies down to B-magnitudes fainter than 24^m. They will serve to constrain the basic cosmological parameters and the scenarios for the evolution of galaxies as well as to investigate the clustering of galaxies in redshift.

With their superb imaging capabilities the FORSes will be particularly valuable for investigating the galaxy environment of QSOs, for probing the large-scale structure of the distant universe in selected fields and, perhaps, for finding very young or still forming galaxies.

Finally we note that in astronomy new and more powerful instruments almost always resulted in the discovery of new and often completely unexpected types of objects. Not the least for this reason are we looking forward with great excitement to the year 1996 when, if everything goes well, FORS I will see its first light at the VLT on Paranal.

Delay Lines of the VLT Interferometer: Current Status

M. FAUCHERRE and B. KOEHLER, ESO

The four 8-m telescopes of the VLT, located at fixed positions, as well as the movable auxiliary telescopes, need delay lines between them to cancel out the optical path difference (OPD) due to sidereal motion. The ESO design comprises 60 metre delay lines using cat's eye optics of 80 cm diameter to transmit an 8 arcsec field-of-view.

An exceptionally high dimensional stability is required both for longitudinal and lateral positioning. A feasibility study was performed by MBB (Ottobrunn) between October 1990 and September 1991 to find solutions for both requirements. The goal was to reach the requirements with a straightforward single-stage approach based on state-of-the-art air bearings (passive solution) or magnetic suspension (active solution).

Six commercially available air bearings were found to be inadequate due to excessive acoustic noise exciting cat's eye eigenmodes. The magnetic suspension option is an elegant solution to actively control vibrations. However, to eliminate uncertainty with regard to stability performance, a prototype is needed to assess the performance at the unusual manometer level.

Following this, tests were performed by ESO and OCA in September 1991 in Limoges (Ateliers Maître, Microcontrôle) and in October 1991 at the TU München on air bearings using different technologies. The test carried out at the TU München on sintered bronze air pads, patented by Prof. Heinzl's group, revealed a level of acoustic noise more than an order of magnitude lower than air bearings previously measured. This shows that air bearings exist which meet our OPD requirement, and that air bearings are still potential candidates for VLTI delay lines.

In conclusion, the main driver to select a solution for VLTI delay lines remains the cost for the design, manufacturing and installation on the site.

References

Jörck, H., Maurer, R., Käse, J., Faucherre, M., Beckers, J.M., Kühn, G. and Hupe, H., "The design of delay lines for the VLT Interferometer", Proc. ESO Conf. on "High Resolution Imaging by Interferometry", Garching, March 1992.

Faucherre, M. and Maurer, R., "On metrology systems for delay lines", Proc. ESO Conf. on "High Resolution Imaging by Interferometry", Garching, March 1992.

Bourlon, P., Faucherre, M. and Koehler, B., "Report on experimental vibration measurements on air bearing pads at Technische Universität München", internal document, issue December 1991.

IRAC 2 – ESO's New Large Format Infrared Array Camera

IRAC 2 has been developed to exploit the new generation of large array detectors for broad and narrow band infrared imaging and to gain experience with these devices of relevance for the VLT. It is equipped with a Rockwell 256×256 pixel Hg:Cd:Te NICMOS 3 array; broad and narrow band filters between 1 and 2.5 μm; a scanning Fabry Perot etalon covering the range ~ 2–2.5 μm at R ~1000 and five selectable objectives providing for image scales from 0.15 to 1.1 arcsec/pixel (at the 2.2-m telescope). At present IRAC 2 is in the integration and test phase in Garching with installation and tests on the ESO/MPIA 2.2-m telescope scheduled for May 1992. An HP workstation will be used for instrument control, with MIDAS available on-line for image display/handling, in line with the current ESO policy of phasing out the HP 1000 computers on La Silla. The final user interface and control software as well as new VME based motor controllers are being developed on La Silla and are planned to be installed in October 1992. In the meantime, the instrument will be used with software developed in Garching for laboratory testing. The accompanying photographs show the instrument mounted on the telescope simulator in Garching and the cryogenically cooled optical assembly.

Observational Capabilities

IRAC 2 will be installed initially at the 2.2-m telescope where it will be mounted on the F/35 infrared adapter. Its main characteristics are summarized in Table 1. It should be noted that the five objectives have been provided not only to allow optimization of the image scale for particular scientific programmes and seeing conditions but also to foresee use of this camera with different array detectors and possibly at the 3.6-m telescope in future. For most applications and average seeing conditions it is expected that the 0.53 and 0.28″/pixel scales will be the most ap-