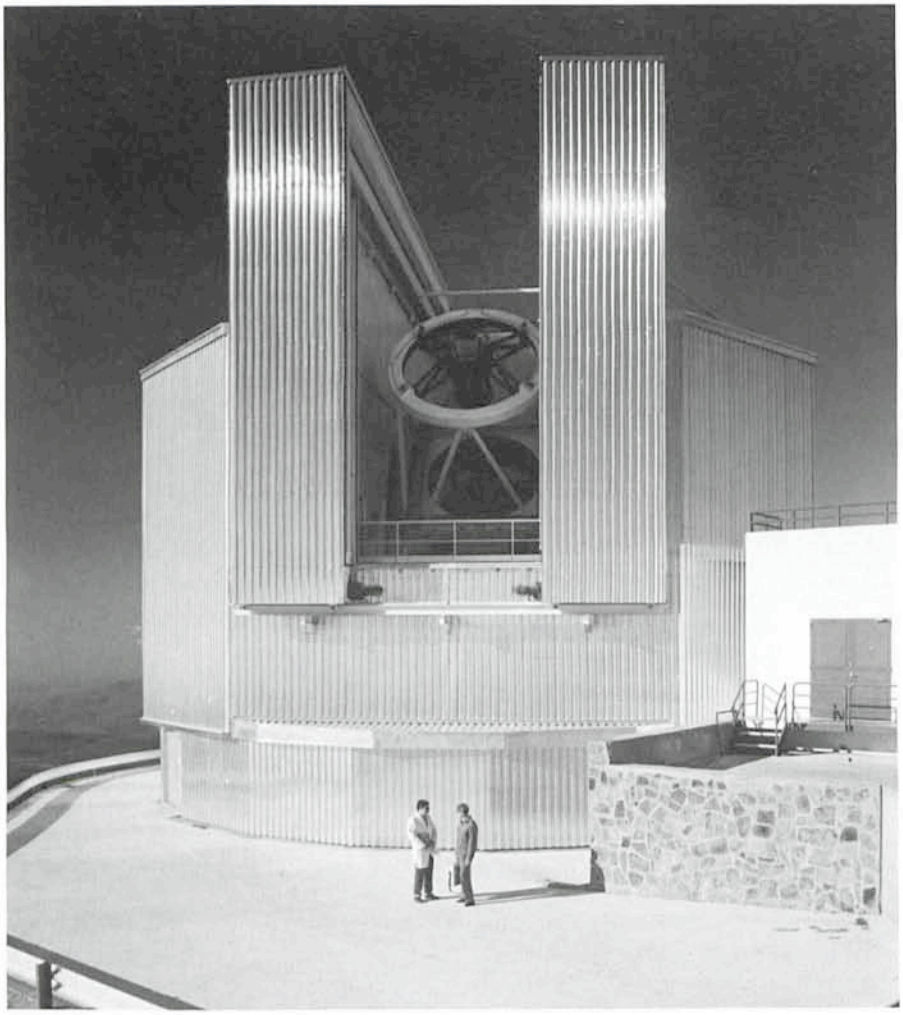
NTT Image Gallery



The ESO New Technology Telescope Building

The ESO New Technology Telescope (NTT) is here seen in its peculiar building at the La Silla Observatory. The telescope incorporates various new technologies; it is the first with an "active optics" system which keeps its 3.58-metre main mirror in perfect shape.

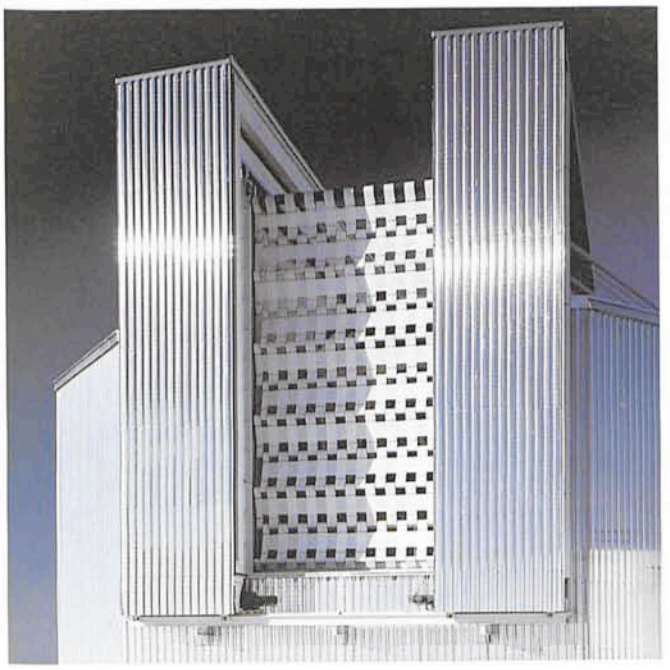
The telescope has one vertical and one horizontal axis (this type of mounting is referred to as "alt-azimuthal"). The building rotates with the telescope during the observations.

The NTT was erected at La Silla during 1988–89. The first regular astronomical observations were made in January 1990 and it was inaugurated on February 6, 1990.

The NTT 3.58-metre Main Mirror

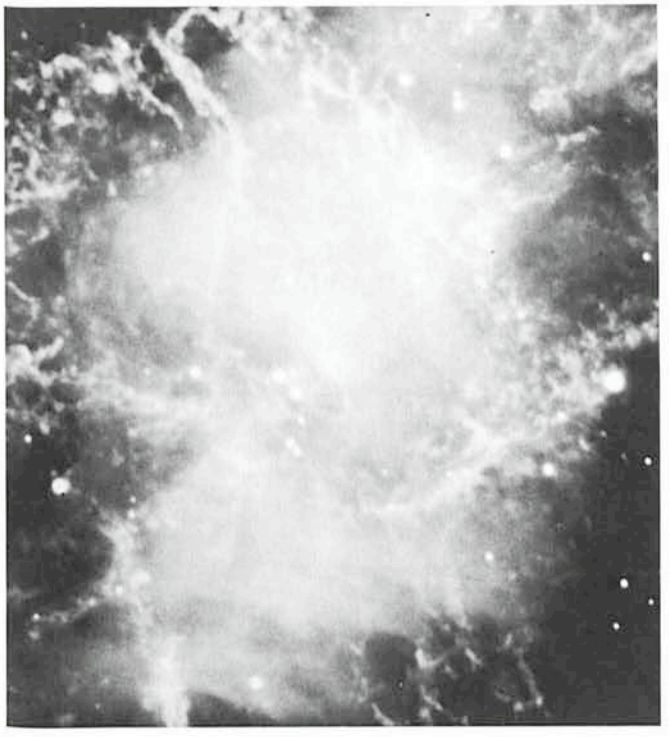
The 3.58-m main mirror of the ESO New Technology Telescope is made of the glass ceramic material "Zerodur". It is comparatively thin (thickness 24 centimetres) and weighs 6 tons.

It is mounted in such a way that it is completely exposed to the surrounding air. This ensures that the mirror always has the same temperature as the air around it and also that the air flow over the mirror surface is as uniform as possible. In this way, the NTT is able to produce the sharpest possible astronomical images.



The NTT Windscreen

During periods of high winds, the ESO New Technology Telescope is protected by a windscreen. It is elevated in front of the telescope to an appropriate height so that it does not impede the observations. In this way wind buffeting on the telescope structure is avoided and the NTT remains stable, even during wind speeds up to 70 km/h.



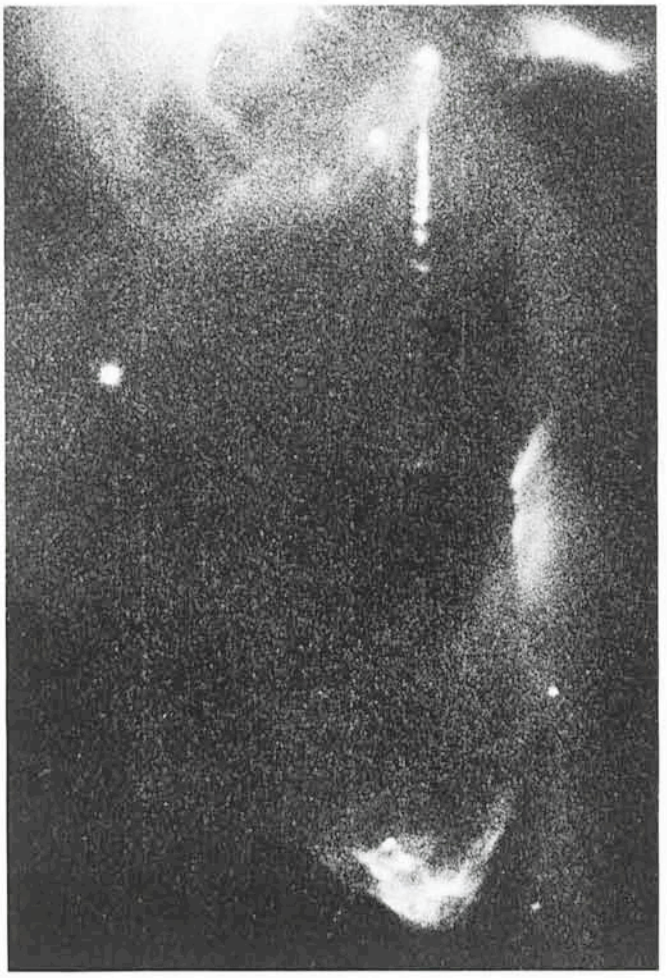
The Central Area of the Crab Nebula

The Crab Nebula, one of the most famous objects in the northern sky, was observed rather low above the La Silla horizon (altitude ~35°) with the NTT. Despite this adverse condition, the picture shows in great detail the complex structure. The Crab Nebula is the remnant of a supernova which exploded in the year 1054.

This view of the central area was obtained with a CCD camera through a red broad-band filter. It depicts both the filamentary structure mainly emitting in the light of hydrogen atoms, as well as the diffuse background light from electrons being accelerated in the magnetic field in the nebula (the synchrotron process).

The central pulsar is the lower right one of the two brighter stars near the centre. The "Wisp Nebula" lies to the right of the pulsar.

Technical data: Exposure: 3 minutes; Filter: R; Seeing: 0.70 arcsec; Field: ~140 × 145 arcsec; Date: December 18, 1989; Observer: Massimo Tarenghi.



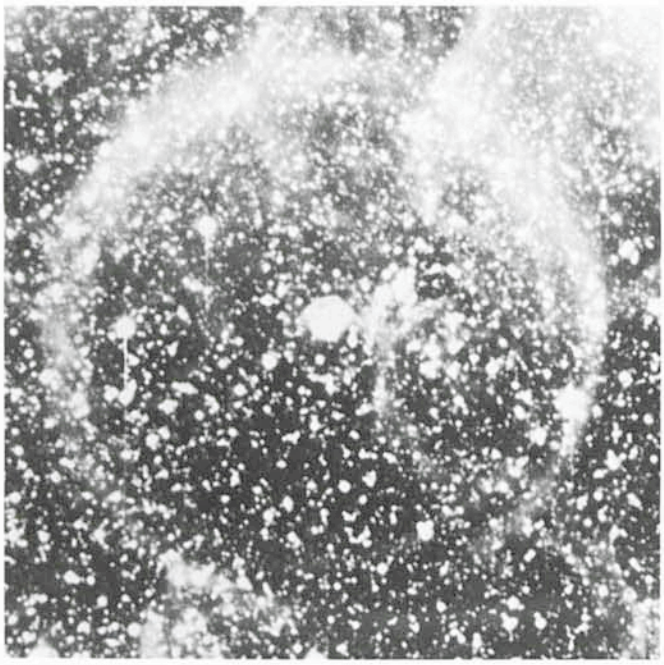
Herbig-Haro Object No. 34

The northern part of the L1641 cloud in Orion contains a large number of small nebulae, known as Herbig-Haro (HH) objects. There are also several jets; one of the most prominent is associated with the HH-34 nebula. It is here shown in a red CCD exposure with the ESO New Technology Telescope.

The jet consists of a large number of knots with typical widths of about 0.6 arcsecond, i.e. they are just resolved on this picture which was obtained with the NTT under very good seeing conditions.

The jet originates at a young star (near the top) and points straight towards HH-34 (bottom) at a distance of 100 arcseconds from the source of the jet (46,000 A.U. or $7 \cdot 10^{12}$ km). The nebula has a typical bow shape and is seen where the jet rams into the surrounding interstellar cloud. It shines in the light of excited atoms and ions. Most of the radiation seen on this photo comes from hydrogen.

Technical data: Exposure 15 min; Filter R; Seeing 0.55 arcsec; Size of field: ~77 × 110 arcsec; Date: December 3, 1989; Observer: Bo Reipurth.



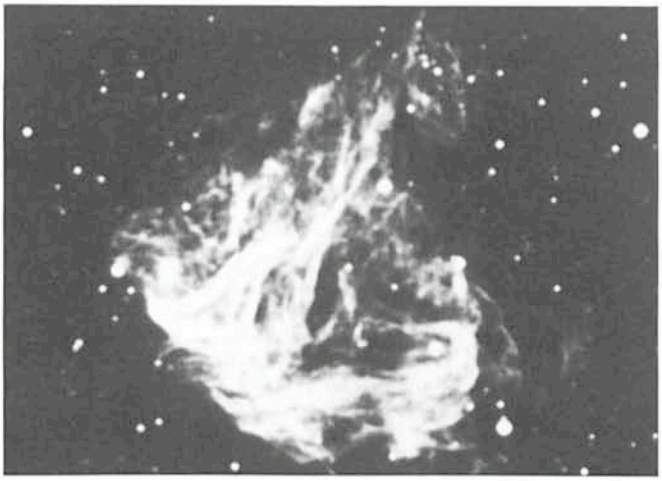
Light Echo Around SN 1987 A

Supernova 1987 A exploded in the Large Magellanic Cloud in February 1987. It was the first naked-eye supernova in nearly four hundred years.

A "light echo" was discovered around this supernova in early 1988. It is light from the supernova, reflected in interstellar dust clouds in the LMC, located in front of the supernova.

This NTT image shows the outer light echo in mid-December 1989. The supernova is the object at the centre, which is shaped as "Napoleon's Hat". The light echo is the bright circular feature extending nearly all the way around the supernova at a radial distance of about 1 arcminute. On this high-resolution CCD image, some structure can be perceived in the light echo. In particular, there are obviously multiple rings in some directions. This corresponds to the spatial distribution of the reflecting dust clouds.

Technical data: Exposure: 10 minutes; Filter: R; Seeing: 0.50 arcsec; Field: 130 × 130 arcsec; Date: December 18, 1989; Observer: Massimo Tarenghi.

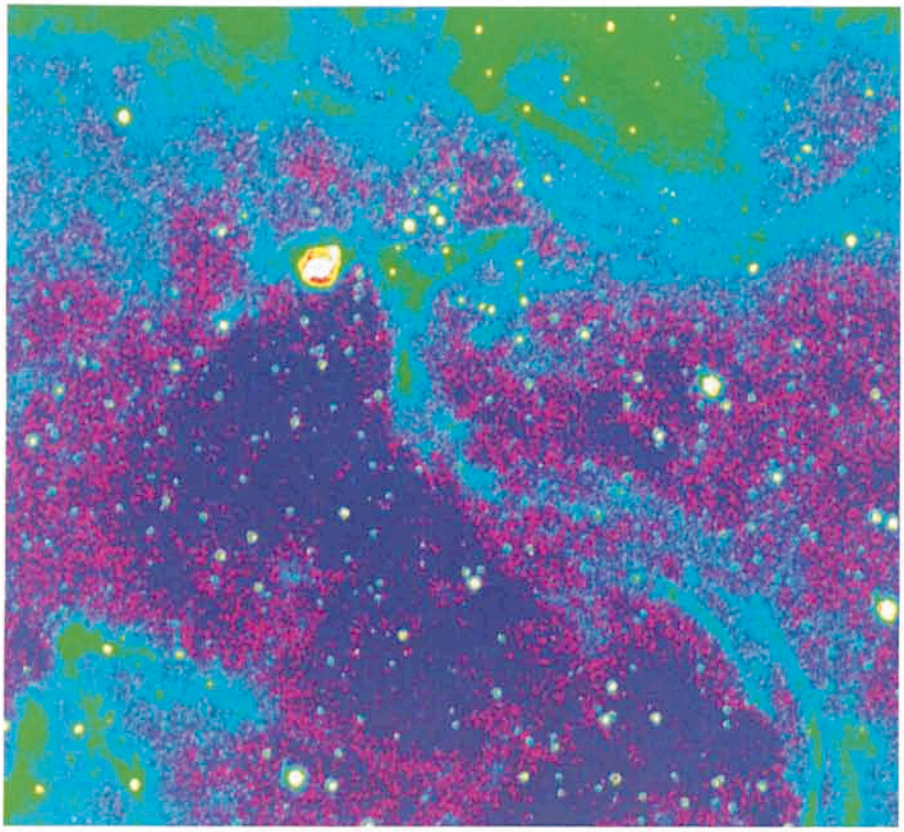


Supernova Remnant N 49 in the LMC

The beautiful filamentary structure of the supernova remnant N 49 in the Large Magellanic Cloud is well brought out on this short CCD exposure with the NTT. It was obtained in red light and most of the emission seen on this image comes from hydrogen atoms.

The nebula was first catalogued by American astronaut-astronomer Henize in 1955. It is located about three degrees due north of the LMC bar. The N 49 nebula is also a source of strong radio emission.

Technical data: Exposure: 3 minutes; Filter: R; Seeing: 0.78 arcsec; Field: 105 × 75 arcsec; Date: January 6, 1990; Observer: Holger Pedersen.



The Surroundings of Supernova 1987 A in the LMC

A CCD exposure of Supernova 1987 A in the Large Magellanic Cloud was made with the NTT in the light of nitrogen ions, under very good seeing conditions. The image is shown in false colours to enhance faint variations of the surface intensity.

It is seen that the supernova is situated at the northern end of a region that is comparatively void of interstellar material. It almost appears as if the progenitor star of the supernova has been moving in this direction, leaving a trail behind. However, the motion of the supernova has not yet been measured, so this is so far only a hypothesis.

A small nebula is seen around the supernova.

Technical data: Exposure: 5 minutes; Filter: [N II] 658 nm; Seeing: 0.45 arcsec; Field: 125 × 115 arcsec; Date: December 18, 1989; Observer: Massimo Tarenghi; Image processing: Joe Wampler; False-colour representation to enhance details.

Dwarf Galaxy NGC 625

The small, irregular galaxy on this NTT CCD image is NGC 625 in the southern constellation of Phoenix. The distance is not well known, but it is probably somewhere between 20 and 30 million light-years.

The exposure was made through a red filter and shows the overall structrure of the galaxy. The brightest stars are well visible as rather sharp points of light, while the emission nebulae are more diffuse.

Note also the dust lanes which hide the light from stars behind them and therefore appear as darker patches among the bright stars and nebulae.

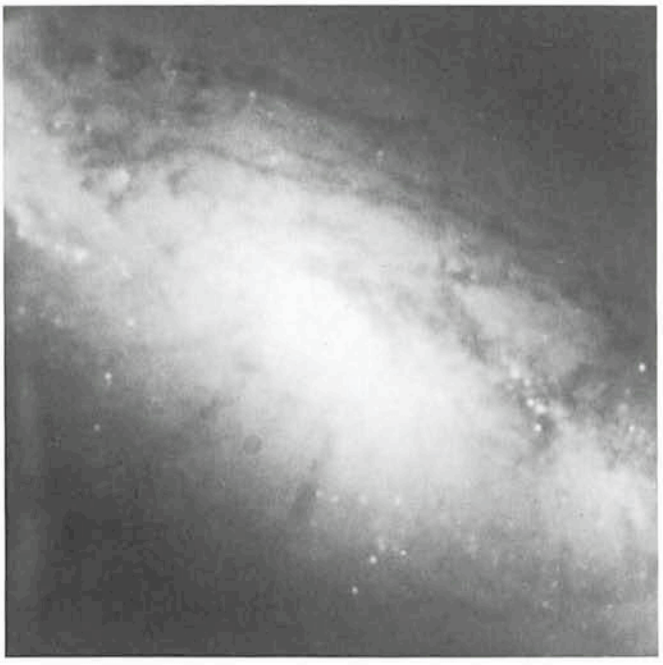
Technical data: Exposure: 90 seconds; Filter: R; Seeing 0.68 arcsec; Field: 140 × 105 arcsec; Date: December 31, 1989; Observer: Jorge Melnick.

The Peculiar Galaxy ESO 060-IG 26

Far down in the southern sky, on the border between the constellations of Volans and Carina, lies this small group of galaxies. It was first discovered at ESO in 1974. The central galaxy is visibly disturbed and now carries the designation "ESO 060-IG 26". The less disturbed galaxy of elliptical shape is "ESO 060-G 27". The distance to the system has not yet been measured, but is probably in excess of 150 million light-years.

This excellent NTT exposure shows in hitherto unknown clarity the peculiar structure of the galaxies in this group. The strange forms are the result of a "recent" galaxy encounter, during which the mutual gravitational attraction pulled out stars and interstellar matter, from ESO 060-IG 26.

Technical data: Exposure: 10 minutes; Filter: R; Seeing: 0.54 arcsec; Field: 115 × 115 arcsec; Date: December 24, 1989; Observer: Massimo Tarenghi.



Violent Motion in NGC 1808

NGC 1808 is a large spiral galaxy in the southern constellation of Columba. This NTT picture of its inner regions give an impression of violent motion; this is confirmed by spectroscopic observations.

There is a strong radio source at the centre of this galaxy and it is classified as being of Seyfert type.

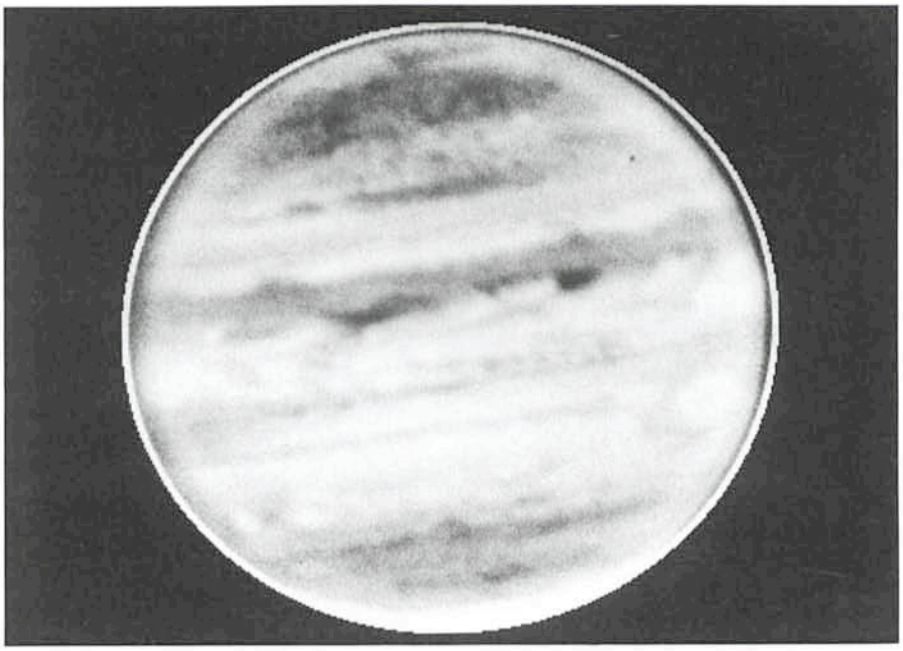
Technical data: Exposure: 6 minutes; Filter: R; Seeing: 0.71 arcsec; Field: 115 × 115 arcsec; Date: December 15, 1989; Observer: Massimo Tarenghi.

Distant cluster of galaxies

One of the main uses of the NTT will be observations of very faint and distant galaxies. It is particularly well suited to such studies, thanks to its great light-gathering efficiency.

On this 15-minute exposure is seen a distant cluster of galaxies in the southern constellation of Hydra. The brightest galaxies have magnitudes around 18; the faintest objects which can be perceived on this photo are close to magnitude 26. Some of these are stars in the Milky Way Galaxy, others are extremely distant galaxies. The good resolution of the NTT facilitates the separation of the two types of objects – the images of galaxies are more diffuse than those of stars.

Technical data: Exposure: 15 minutes; Filter: R; Seeing: 0.75 arcsec; Field: 150 × 98 arcsec; Date: 23 December 1989; Observer: Edmond Giraud.



Infrared Image of Giant Planet Jupiter

This is a very short CCD exposure of the giant planet Jupiter, obtained with the NTT through an infrared filter with a passband near 1000 nm. At the time of the observation, Jupiter was only 35° above the northern horizon at La Silla.

The image has been subjected to moderate image processing: the intensity over the surface has been flattened to bring out small intensity variations over the entire surface.

The image shows many of the bands in the Jovian atmosphere, and also some of the whirls in these bands. The Great Red Spot in the south is not very prominent in this spectral band, but is still faintly visible near the western rim. None of the satellites were in transit at the moment of observation.

This is an excellent image by a ground-based telescope; the smallest features which can be perceived (that is the linear resolution) on Jupiter's disk measure about 2000 kilometres.

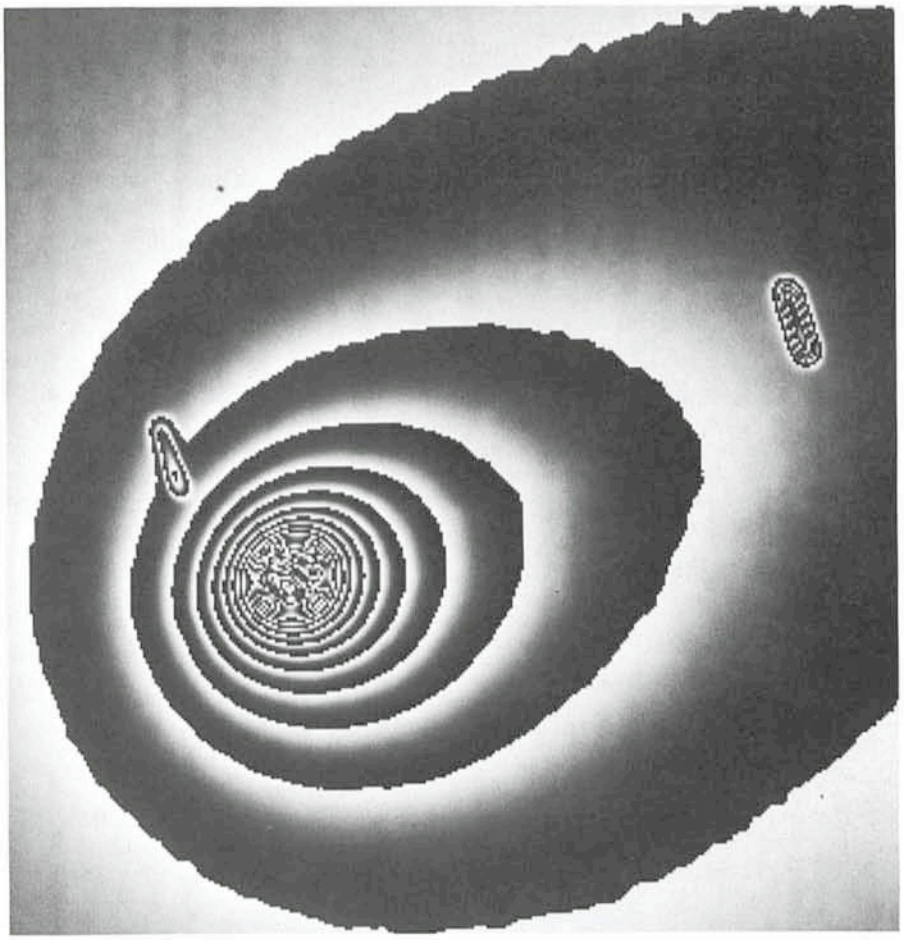
Technical data: Exposure: 0.03 second; Filter: Gunn-z; Diameter of Jupiter's disk: 47 arcsec (equator); Seeing: 0.6 arcsecond; Date: UT January 6.174, 1990; Observer: J. Melnick; Image processing at ESO Headquarters with IHAP/MIDAS.

Comet Austin

This is a short NTT CCD exposure of the newly discovered Comet Austin (1989 c1) which may become comparatively bright during mid-April 1990 when it approaches the Sun to within 50 million kilometres. On May 25, it will be only 36 million kilometres from the Earth. After mid-April, it will be well visible from the northern hemisphere in the early morning.

Curves of equal brightness (isophotes) are shown. The stars in the field are trailed because the telescope was set to follow the comet's motions. On this date, the comet had not yet developed a real tail and the image shows the dust cloud (coma) around the nucleus which is overexposed on this image. It is situated at the centre of the isophotes. At the time of the exposure, the comet was nearly 300 million kilometres from the Earth and 255 million kilometres from the Sun, still outside the orbit of planet Mars. The magnitude was about 9.

Technical data: Exposure: 5 minutes; Filter: R; field: 75 × 75 arcsec; Seeing: 1.2 arcsec; Date: January 23, 1990; Observers: P. Bouchet, J. Melnick, L. Pasquini and Ch. Gouiffes.



Professor Pierre Charvin, † January 24, 1990

On January 25, 1990 we at ESO were shocked and saddened by the message of Pierre Charvin's death. President of the Observatoire de Paris and astronomy leader in France, Prof. Charvin always showed a deep interest in ESO affairs and contributed through the years to the development of ESO's relations with astronomical institutes in his country.

The past five years he was a member of our Scientific-Technical Committee and for the last two years he energetically served as STC president. In that function he became very involved in the planning of the VLT and its instrumentation.

In an impressive commemorative meeting, in the Salle Cassini of the Observatoire de Paris, attended by his institute's staff and by astronomers from throughout France, I spoke on ESO's behalf, ending as follows:

"De la part de l'ESO, de notre personnel, de notre communauté des utilisateurs, du directorat de l'ESO, du Conseil et du STC, j'exprime notre sentiment de reconnaissance et notre profond respect. Je suis reconnaissant d'avoir la possibilité de faire cela dans cette salle, m'adressant au personnel de l'Observatoire de Paris et à tous ceux qui sont concernés avec 'notre science' en France. Nos pensées et notre sympathie sont destinées à la famille en deuil. Notre mémoire pour Pierre Charvin est marquée par notre admiration pour son enthousiasme et pour son énergie créatrice."

With profound regret to miss him so prematurely, we pay tribute to this prominent colleague and friend.

Harry van der Laan
Director General

New ESO Scientific Preprints

(December 1989–February 1990)

680. I.J. Danziger et al.: Molecules, Dust and Ionic Abundances in SN 1987A.
L.B. Lucy et al.: Dust Condensation in the Ejecta of SN 1987A, II.
P. Bouchet et al.: The ESO Infrared Data Set.
To be published in *Supernovae*, Proceedings of the 10th Santa Cruz Summer Workshop in Astronomy and Astrophysics, held at UC Santa Cruz, July 10–21, 1989, ed. by S.E. Woosley (Springer-Verlag, New York).

681. S. di Serego Alighieri, G. Trinchieri and E. Brocato: Hα Imaging of X-ray Luminous Early-type Galaxies: Clues on the Hot, Warm and Cold Phases of the ISM. To be published in *Windows on Galaxies*, Fabbiano et al. (eds.), Proc. of Workshop in Erice, 21–31 May 1989.

682. M.R. Rosa and J.S. Mathis: Wolf-Rayet Nebulae – Chemical Enrichment and Effective Temperatures of the Exciting Stars.
M.R. Rosa: Atomic Data for and from the Analysis of Gaseous Nebulae. To be published in: Proceedings of the First Boulder-Munich Workshop on Hot Stars, Boulder, CO, August 1989, C.D. Garmany (ed.), Publ. A.S.P. Conf. Ser.

683. B. Barbanis: Escape Regions of a Quartic Potential. *Celestial Mechanics.*