radiation. This outside influence may be the cause of the vigorous formation of stars occurring in this small cloud: there are several nebulous stars, Hα emission stars, and embedded infrared sources, and we have found a new Herbig-Haro object (HH 122, seen as a tiny group of small nebulae near the eastern edge of the cloud). A detailed optical infrared/radio study is currently being made of L 1622 at La Silla.

Acknowledgements

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Professors J.H. Oort, H. van der Laan and A. Blaauw looking at the La Silla model.

On Friday, January 27, Professor Adriaan Blaauw opened the ESO Exhibition in The Hague, the Netherlands, with a review of ESO's history since 1952. This was preceded by a speech from the Director General about ESO's future and its role in European astronomy.

Among many prominent guests were Prof. Jan Hendrik Oort and Dr. Henk Bannier, both former Presidents of the ESO Council, and the present members of Council, Prof. Wim Brouw and Dr. Jan Bezemer.

The Exhibit, which lasts till March 12, 1989, is hosted by the beautiful new Science Museum of The Hague called MUSEON. ESO is especially grateful to Dr. Wim van der Weiden, MUSEON's Director, for his enthusiastic reception. The Exhibit was set up by Mr. Claus Madsen of ESO and Dr. Peter Wisse, staff astronomer of MUSEON.

The festive opening was co-hosted by OMNIVERSUM, Europe's first space-theatre, next door to MUSEON. OMNIVERSUM openend in December 1984 and is the result of a sustained initiative by Prof. Harry van der Laan between 1977 and 1984, while he was Chairman of nearby Leiden Observatory.

Observation of the ^{12}CO (J = 1 → 0) Line in NGC 613 with the SEST

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Introduction

The availability of the Swedish-ESO Submillimeter Telescope (SEST) on La Silla opened the possibility of extending the radio observation of molecular lines to the very southern galaxies. In particular the observation of the CO lines in the nearest galaxies will permit not only to increase the sampling for statistical purposes but also to study in more detail the distribution and kinematical properties of the molecular clouds in relation to other components of the galaxies. The HPBW of the SEST, at the frequency of 115 GHz of the ^{12}CO (J = 1 → 0) line, is 43″ which means that galaxies with diameters between 5.5 and 10 minutes of arc are well suited for mapping since they do not require a prohibitive amount of time and the arms can be resolved if the inclination angle is adequate.

We had selected NGC 613 some time ago as a candidate for CO observation because of several interesting features,

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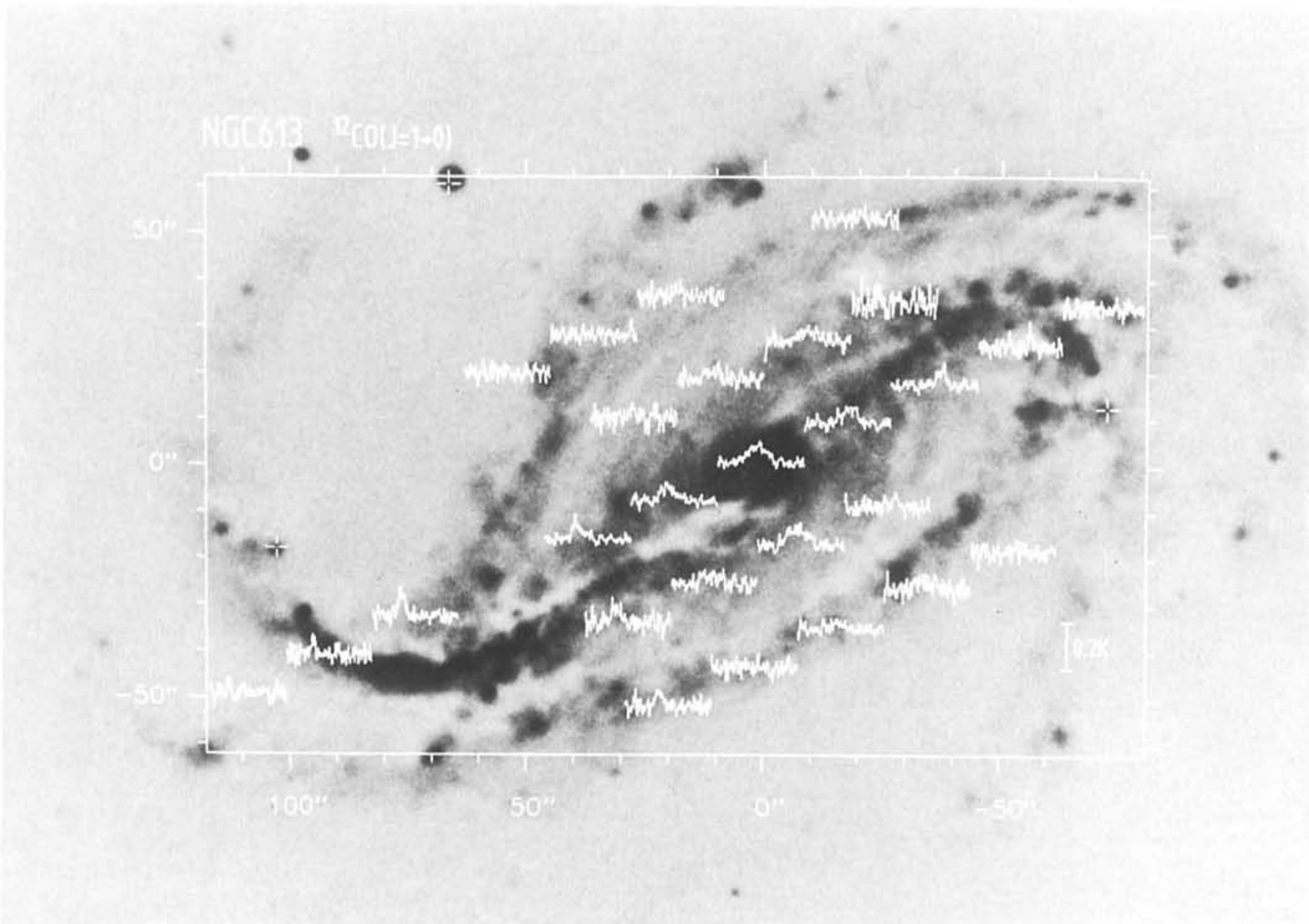

Figure 1: *The ^{12}CO ($J = 1 \rightarrow 0$) profiles (velocity range 1,000 to 2,000 km s^{-1}, resolution 7.2 km s^{-1}) in NGC 613 overlayed on an optical picture of the galaxy. Coordinates on the frame indicate offsets with respect to the centre. North is at the top, east to the left.*

which will be described in the following section, and since it fulfills the size condition (diameter about 6′) we proposed it for the observation with the SEST. The observations were made in July 1988. Here we present the preliminary results.

NGC 613

NGC 613 is a moderately southern ($\delta = -29^\circ\!.66$) barred spiral galaxy, classified as SB(rs)bc by de Vaucouleurs (1976). The bar and the several arms are well delineated by prominent dust lanes and H II regions. The galaxy has been studied with optical spectroscopy by Burbidge et al. (1964) who were able to determine the position angle (115°), the central velocity (1,534 km/s, heliocentric) and the rotation curve.

It has also been observed in the radio continuum at λ 6 cm and λ 20 cm and in the Hα and [O III] λ 5007 lines by Hummel et al. (1987). These observations show that there are jet-like structures extending from the centre indicating the presence of nuclear activity. The linear scale of these features is of the order of 5″ to 30″, thus unresolvable by the SEST beam.

The galaxy has been observed previously in the ^{12}CO ($J = 1 \rightarrow 0$) line by Elmegreen and Elmegreen (1982) who reported a marginal detection at the centre with an upper limit of 0.04 K using the NRAO 10 m dish at Kitt Peak. Observations in the H I 21 cm line were made by Bajaja (1978) and Reif et al. (1982).

Observation and Reduction

The SEST has been described by Booth et al. (1987). The antenna parameters, at λ 2.6 mm, are: HPBW = 43″, beam efficiency = 0.78, aperture efficiency = 0.67. At the front-end a dual polarization 85–117 GHz receiver with cooled Schottky diode mixers and a single side-band noise temperature of 250 K was available. At the back-end we used a wide band Acousto-Optic Spectrometer (AOS) with 1,700 channels spaced 690 kHz (1.8 km s^{-1} at λ 2.6 mm).

The observations were made between the 25th and the 29th of July, 1988. The beam was switched in position, every 2 minutes, between the source and a reference point at 12′ to the west. The integration time per point was, in general, 16 minutes but some positions, especially along the major axis, were observed longer. A total of 27 points were observed on a square grid with 20″ spacing, aligned with the major and minor axis (position angle = 115°), covering the central part of the galaxy. During the time these observations were being made, it was realized that there was a problem with the telescope pointing. Sudden jumps of the order of 1′ occurred near azimuth = 0°. Since NGC 613, however, was observed from rising to meridian crossing, only few spectra, which could be easily identified, were lost because pointing parameters used by previous observers were adopted. We believe, that the accuracy of the positions is within 5″ which is 12 % of the beam size.

The spectra were saved on tape with FITS format and read at the MPIfR Microvax converting it to CLASS readable format. This facility was employed to correct the baselines and to do Hanning smoothing. The average rms noise, in the spectra with a velocity resolution of 3.6 km/s, is 0.03 K of corrected antenna temperature.

Results

Figure 1 shows the obtained profiles. The CO profiles were Hanning smoothed two times so the velocity resolution of the displayed profiles is 7.2 km s^{-1} and the rms noise goes from 0.01 K to 0.03 K depending on the integration time and observing conditions. The velocity range on each profile is 1,000 to 2,000 km s^{-1} from left to right. Along the major axis we have the profiles with the lower noise. In spite of the fact that one profile is missing in the sequence (at the offset 60″ to the SE) the position-velocity diagram (Fig. 2b) clearly shows the velocity variation along this axis. From this diagram it is possible to determine the heliocentric velocity of the centre of the galaxy which is 1,470 ± 10 km s^{-1} and the rotation curve (correcting for the inclination).

The differences between this central velocity and the velocities obtained from global H I profiles by Bajaja (1978) (1,431 km s^{-1}) and by Reif et al. (1982) (1,493 km s^{-1}), are consistent with the noise in the spectra. The difference with the velocity derived by Burbidge et al. (1964) from optical observations, however, is rather large (64 km s^{-1}). The highest velocities along the line of sight, with respect to the centre, in Figure 2b, are about 150 km s^{-1}. This value is also smaller than the highest velocities seen optically by Burbidge et al. (200 to 250 km s^{-1}). At both ends of the diagram appear features at velocities that correspond to the other side of the galaxy which would imply rotation in the opposite sense. These features are most probably due to the noise. It should be mentioned that Burbidge et al. (1964) also found strong irregularities at both sides of the centre, although neither at the same distance nor with the same velocity differences. Along the minor axis (Fig. 2a) the velocities cover a range of about 275 km s^{-1}. This is a consequence of the steepness of the rotation curve and the width of the beam. The CO emission is asymmetrically distributed, being mainly concentrated on the SW side.

The derivation of the molecular gas mass from the areas of the profiles of Figure 1 depends on the distance to the galaxy and on the conversion factor to H_2 column densities. Both contain large uncertainties. Assuming a distance of 19 Mpc as derived from the systemic velocity, corrected for the motion with respect to the Local Group, assuming a Hubble constant of 75 km s^{-1} Mpc^{-1}, and a conversion factor of 4 10^{20} cm^{-2} (K km $s^{-1})^{-1}$, the mass of the gas in the form of molecular hydrogen would be about 3.1 10^9 $M_\odot$. The mass of the neutral hydrogen estimated by Reif et al. (1982) is about 3.6 10^9 $M_\odot$, which means that the total gas (H I + H_2) mass would be about 6.7 10^9 $M_\odot$. Assuming an inclination angle of 45 degrees, the highest rotational velocities, which are measured at about 80″ from the centre, (Fig. 2b) are of about 212 km/s. With these values it is possible to estimate roughly the total mass within that radius as about 7.6 10^{10} $M_\odot$. The ratio between the gas and the "total" mass would then be of the order of 9% if the assumed values for the parameters used in these calculations are valid.

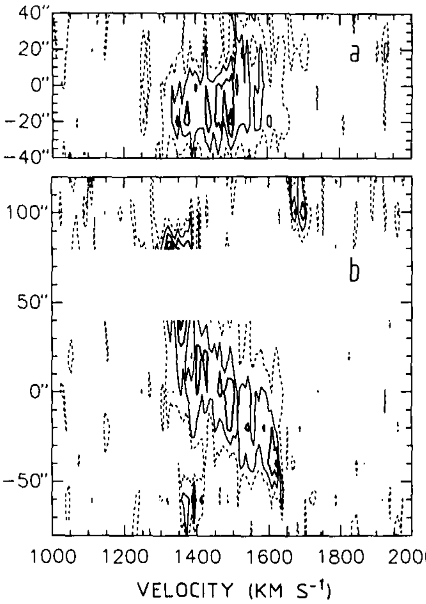

Figure 2: *Position-velocity diagrams along (a) the major axis, (b) the minor axis. Velocities are heliocentric. Ordinates indicate offsets, along each axis, with respect to the centre of the galaxy. First contour lines (dashed) correspond to the level 0.02 K of antenna temperature. The contour interval is 0.02 K.*

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We are grateful to all the ESO staff members who made these observations possible.

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High Resolution Hα Spectroscopy of Nova Centauri 1986: Tracing a Transient in the Spectral Evolution

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We present here some preliminary results and considerations regarding high resolution spectroscopy of Nova Centauri 1986. This object was discovered on November 22.7 UT as a 5.6 V magnitude star (1), and observed by us in Hα two months later, when it was of about 10 magnitude. A considerable change in the Hα line profile, basically consisting in the disappearance of the original flattop profile substituted by a more regular multicomponent profile, is clearly visible in our set of spectra, obtained monitoring the nova for nearly a week. A fitting of the line profile by means of three gaussian components shows a narrowing of the components and a rapid fading of one of them as a function of time. This behaviour can be interpreted in terms of blobs which have been formed in a non-spherical explosion and that