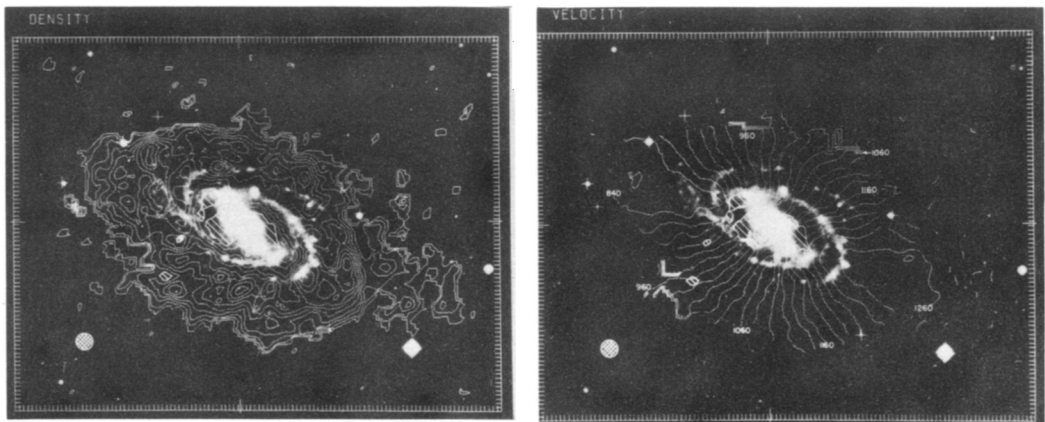


OBSERVATIONS OF THE NEUTRAL HYDROGEN IN THE BARRED SPIRAL GALAXIES NGC 3992 AND NGC 4731

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We report observations of the atomic hydrogen properties of the barred spiral galaxies NGC 3992 and NGC 4731. These systems were observed in 1980 and 1981 with the VLA telescope of the National Radio Astronomy Observatory. In Table 1 we list the systemic parameters of interest.



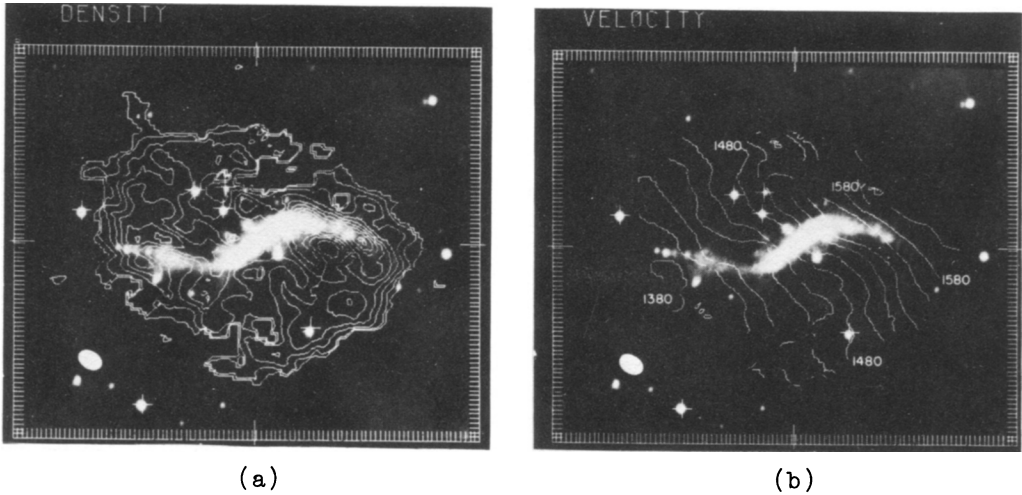
(a)

(b)

Figures 1a and 1b. Show the column density and velocity field of the HI in NGC 3992. The central region is devoid of gas. The (α, δ) scales are 6 arcseconds per interval. The synthesized beam is shown

In figures 1a and 1b we show the neutral hydrogen column density and the observed, temperature-weighted, mean velocity field of NGC 3992 superimposed on optical photographs of the galaxy. The disk and spiral arm structure of this system emit strongly and we observe a low density tail at the preceding edge of the galaxy. Unfortunately, the inner zone that is dominated by the bar is deficient in HI. The velocity field shows perturbations of the order of 10 km/sec, where the line-of-sight crosses the spiral arms. Also the velocities drop sharply in the low density

tail indicating that this material may not be rotating in the fundamental plane. Owing to the poor signal-to-noise ratio in the central region, not very much can be said about the kinematics of the barred zone.



Figures 2a and 2b. Show the column density and velocity field of the HI in NGC 4731. The (α, δ) scales are 6 arcseconds per interval and synthesized beam is shown.

In figures 2a and 2b density and velocity data for the galaxy NGC 4731 are displayed. Both the bar and spiral arms are bright and well resolved by these observations. The effect of the bar on the kinematics of the system are strong, especially if contrasted with NGC 3992. As the line-of-sight crosses the bar, velocity perturbations of about ± 10 km/sec are seen. Also, the apparent line-of-nodes, as defined by the velocity field, is rotated substantially with respect to the HI distribution. This research is partially supported by the NSF.

Table 1

Systemic and Observational Parameters for the Galaxies NGC 3992 and NGC 4731

| | NGC 3992 | NGC 4731 |
|--------------------------------|---------------------------------------|---------------------------------------|
| Optical Diameter | 7.6 arc. min. | 6.5 arc. min. |
| Type | SBT 4 | SBS 6 |
| Systemic Velocity | 1046 ± 5 km/sec | 1488 ± 5 km/sec |
| Distance | 14.2 Mpc | 10.5 Mpc |
| Angular Resolution | 22"9 x 20"7 | 33"2 x 23"2 |
| Linear Resolution | 1.58 x 1.43 kpc | 1.69 x 1.18 kpc |
| Velocity Resolution | 25.2 km/sec | 25.3 km/sec |
| RMS sensitivity: Janskies/Beam | 0.96×10^{-3} | 2.46×10^{-3} |
| Kelvins | 1.3 | 2.0 |
| Detected HI mass (solar units) | 2.6×10^9 | 1.8×10^9 |
| Maximum HI surface Density | 1.4×10^{21} Cm ⁻² | 2.5×10^{21} Cm ⁻² |