

THE DISTRIBUTION OF THE MOLECULAR GAS IN NGC 6946

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We present CO(2-1) and (1-0) maps of the inner disk of the nearby Scd spiral NGC 6946 ($D= 5$ Mpc). These maps have been obtained using the IRAM 30m telescope (beamsizes = 22" and 14", map sampling 10"= 250 pc). The CO(2-1) map contains about 1500 points and covers approximately the inner disk out to $R = 3.5'$. The overlay of CO(2-1) line area and H α emission (figure 1) shows that spiral arms are seen in CO and is a very good correspondence between the optical and molecular arms. However there is CO emission in between the arms ; the contrast in both lines is about 4. Note also the oval distribution of CO emission in the nucleus, revealing the presence of a bar. The CO(2-1)/CO(1-0) emissivity ratio is low (around 0.5 in the disk) suggesting subthermal excitation.

Contrary to what has been observed in some regions of M51 (where the density wave is probably stronger), HII regions, HI and CO maxima are closely correlated inside "superclouds" of molecular masses up to $5 \cdot 10^7 M_{\odot}$. The kinematics of these three components are also well correlated. As for shearing motions, they are detected in HI. In CO, the arms are so narrow (high contrast) that it is difficult to detect them.

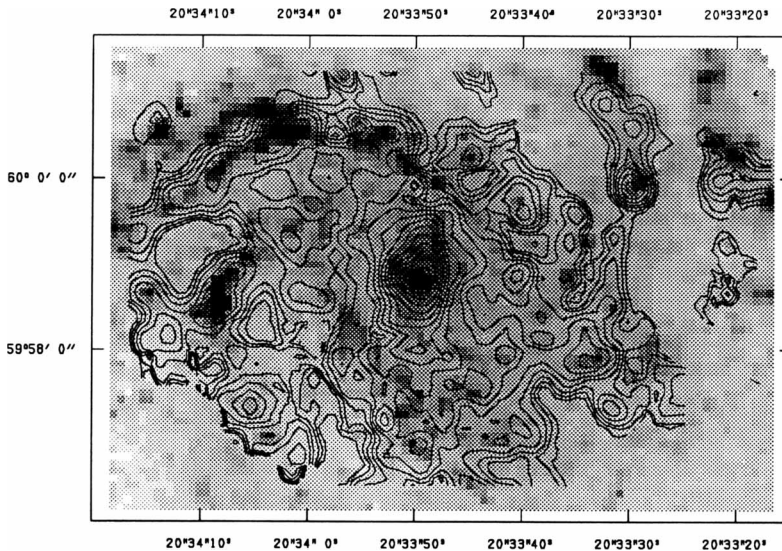


Figure 1 : CO(2-1) line area (contours : from 1.5 to 170 Kkm/s, log increment) overlaid on H α emission (grey-scale)