of the molecular gas shows a cylindrical structure nearly perpendicular to the plane.

PUDRITZ: Have you surveyed the immediate environs of M82 for CO emission?

NAKAI: We have mapped only in the region of 90" square because of the smaller beam size, the weaker emission of CO in the outer region, and the limited observing time. Stark and Carlson (1984, Astrophys. J. 279, 122) and Young and Scoville (1984, Astrophys. J. 287, 153) have surveyed up to 2' - 3' from the galactic plane.

COMBES: I would like to mention that dynamical models computing the behaviour of molecular gas in a bar potential reveal the formation of molecular rings close to the center, when the bar angular velocity is low. These rings could in fact be elliptical and the gas would then be observed in non-circular-motions. This is a possible interpretation for the molecular ring in M82.

LO: While the CO observations of M82 are only confined to the central region and therefore do not address directly whether gas is flowing inwards or out, it is clear that the latest site of star formation occurs at the region of high gas concentration: the inner 1 kpc. Since accretion does not directly explain the confinement of gas to the nuclear region, some additional mechanism must be involved. Furthermore, NGC 253, as a star-burst galaxy with properties very similar to M82, does not have a companion, indicating accretion alone does not necessarily account for star-burst. However, for the $10^{12} L_\odot$ galaxies such as Arp 220, the extent and the amount of gas required for the star-burst indicate that direct "face-on" collisions of galaxies are necessary.

HEIDMANN: Following the last comment by Lo, in the same direction it can be said that it is difficult to invoke infall to explain the active star formation in the clumps of clumply galaxies as they are scattered all over the body of these galaxies.

MOLECULAR GAS IN THE NUCLEUS OF M82

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7"-resolution CO (1-0) observations of M82 with the Owens Valley millimeter-wave interferometer have resolved 2 components of molecular gas in the central 1.5 arcmin of the galaxy: (1) a high plane of M82, and (2) shell-like or filamentary structures of molecular gas, with size-scale as large as 400 pc, extending most likely out of the plane of the galaxy.

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The central concentration of molecular gas is coexistensive with other tracers of recent star formation: 10 μm emission, 6-cm radio continuum and supernova remnants. This spatial correlation supports the explanation that the large far-infrared luminosity of M82 originates from molecular clouds with embedded young stars formed in recent bursts.

However, the mechanisms for supplying and confining the gas in the central 1 kpc and for triggering the star formation are still uncertain. Accretion from outside the galaxy may have contributed to the supply, while the triggering may have been due to an incipient bar.

The kinetic energy of the shell-like features amounts to $\gtrsim 10^{52}$ ergs, corresponding to energy inputs from >> 100 supernovae within 10^5 years, the presumed age of these shells. However, the spatial extent of these shell-like structures is much larger than that of the observed radio supernova remnants. Whether the extended molecular gas in M82 is expelled from the galactic plane or accreted from outside the galaxy remains unsettled.

DISK GALAXIES: THE GLOBAL PROPERTIES OF STAR FORMATION AND THE CHEMICAL ABUNDANCE GRADIENTS

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In the relatively gas-rich, pure exponential disk galaxies, available data is accumulating which suggests that the distribution of star-formation in the disk either shows no radial variation, or else has a scale-length which is much longer than that of the stars.

We combine the van der Kruit and Searle disk model with the hypothesis that star-formation and the associated energetic processes pressurise the various phases of the interstellar medium to develop a simple new model of star-formation moderated collapse of galactic disks. This correctly predicts the current distribution of star-formation and the global rates of star-formation in a wide variety of galaxies. It further predicts that the star-forming disks spread outwards with time, as rotationally supported gas in the outer disk becomes progressively unstable to self-gravitational collapse in the azimuthal direction.

We use our recent theoretical re-calibration of the chemical abundance scale of extragalactic H II regions to investigate the implications of this model in the chemical evolution of galaxies.