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

Michael A. Dopita, Ian R. Evans
Mt. Stromlo and Siding Spring Observatories
The Australian National University, Australia

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.

https://doi.org/10.1017/S0074180900096546 Published online by Cambridge University Press