

MOLECULAR HYDROGEN IN THE YOUNG STARBURST IN NGC 253

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Abstract

We have observed shocked molecular hydrogen around the nucleus of the nearby galaxy, NGC 253. This galaxy has a relatively modest luminosity ($\sim 3 \times 10^{10} L_{\odot}$) and appears to have no distortions or companions that would indicate a possible interaction. The energy of the galaxy appears to be derived primarily from a starburst (Rieke and Low 1975; Wynn-Williams et al. 1979; Rieke et al. 1980; Klein et al 1983; Beck and Beckwith 1984; Fabbiano and Trinchieri 1984). Thus, our observations have caused us to examine the starburst process in some detail to identify how the molecular hydrogen is excited.

We propose that the molecular hydrogen emission is produced by collisions of dense molecular clouds accelerated by supernovae explosions. Within the nucleus, this process occurs early in the life of the starburst. We suggest a sequence of nuclear starburst development; examples along this sequence from young to old would include NGC 253, M82, NGC 1097, and M31.

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