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VLA observations at 1465 MHz of the Stephan's Quintet region reveal that the arc-shaped area of emission discussed by Allen and Hartsuiker (1972) breaks up into several components. The idea that NGC 7318b is a recent interloper in the group and that the interaction resulting from this event causes the enhanced activity at the east side of NGC 7318b is adopted as still the most reasonable explanation. The results are discussed in more detail in another paper (van der Hulst and Rots, 1981).

1. INTRODUCTION

When Allen and Hartsuiker (1972) originally discovered the radio emission between NGC 7319 and NGC 7318b, they proposed that the emission traces a galactic bow shock due to the gravitational accretion of gas by NGC 7319 as it moves through the group of galaxies. The more recent HI studies by Allen and Sullivan (1980) and Peterson and Shostak (1980) have somewhat modified this picture. These authors propose a collision between NGC 7319 and NGC 7318a, to explain the HI distribution. They also suggest that NGC 7318b had no part in the collision and is a recent interloper in the group.

2. OBSERVATIONS AND RESULTS

We observed Stephan's Quintet with the partially completed VLA in November 1979 at 1465 MHz. Maps were obtained with resolutions of 2.25", 6", and 24". Figure 1 shows the 6" resolution map superimposed on a IIIaJ photograph of Arp (1973). Various individual sources of radio emission were detected:

(i) The nucleus of NGC 7319. The flux density of this source is 20.5 ± 1.0 mJy. It is slightly extended and shows a jet-like feature at a position angle of 207° , nearly perpendicular to the central bar in this galaxy.

(ii) Discrete source north of NGC 7318b. The northern part of

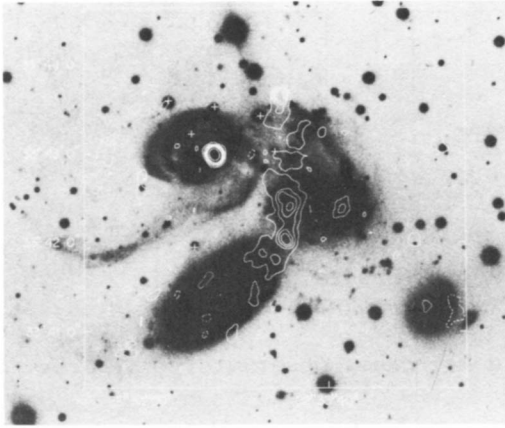


Figure 1. Contour diagram of the 6'' resolution VLA map of Stephan's Quintet, superimposed on a IIIaJ photograph of Arp (1973). The contour values are -0.6 (dashed), 0.6, 1.2, 1.8, 2.4, 3.6, 4.8, and 9.6 mJy/beam.

Allen and Hartsuiker's (1973) arc of emission resolves into a discrete, slightly extended source. It probably is an unrelated background source.

(iii) NGC 7318b. The central part of the arc appears to curve to the east, rather than the west. On a global scale it coincides with spiral arm features and HII regions, although there are definite systematic displacements. There is a diffuse extension to the south, partly covering NGC 7320.

(iv) The center of NGC 7318a. A weak radio source was detected here with a flux density of 1.3 ± 0.3 mJy.

3. DISCUSSION

Our observations lend support to the hypothesis that NGC 7318b is an interloper in Stephan's Quintet. The most likely scenario involves a burst of violent star formation at the eastern edge of NGC 7318b induced by its interaction with the group and the intergalactic medium, and resulting in the formation of giant HII regions and an enhanced rate of supernova events. The general coincidence of the radio emission with regions of optical emission, including bright HII regions as signposts of recent activity, supports this idea.

REFERENCES

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