

Radio Interferometric Observations of NGC 2146

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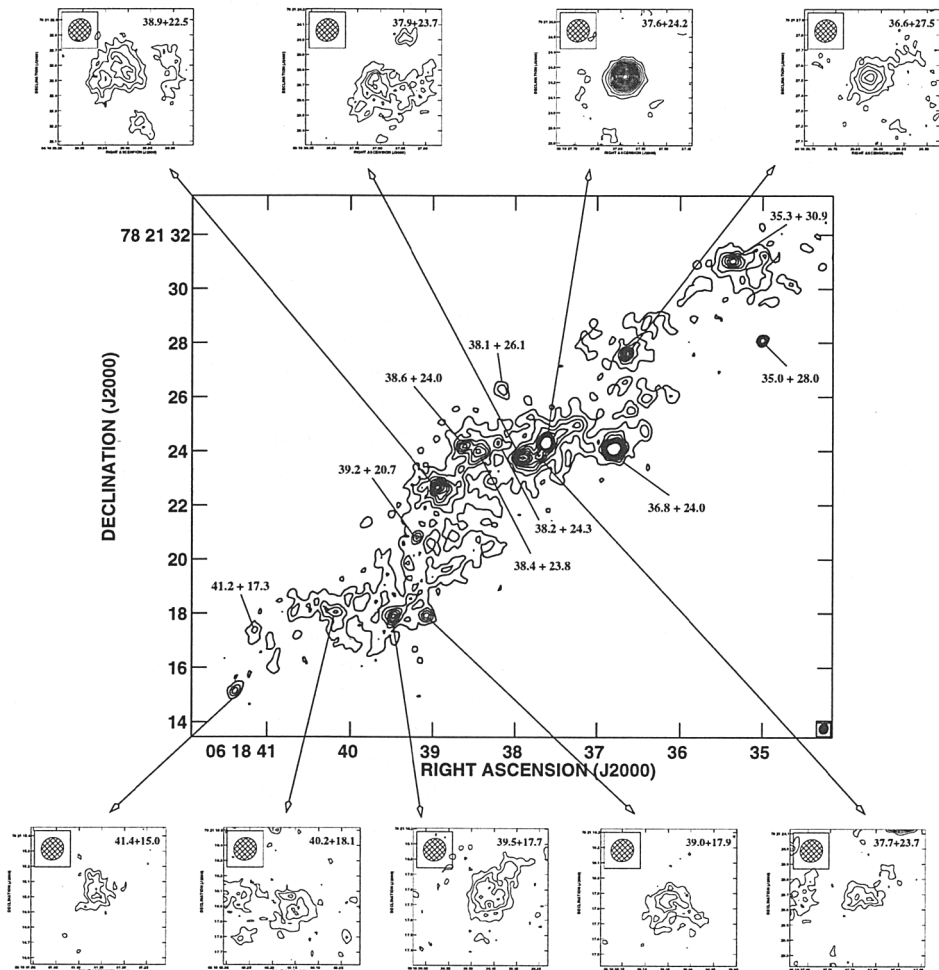


Figure 1. The 5 GHz pure uniformly weighted A,B,C-array VLA map, with a beam (HPBW) of $0''.37 \times 0''.32$. The smaller maps are sub-images of 9 sources from the MERLIN + VLA A-array uniformly weighted map (resolution $0''.15 \times 0''.14$). For these sources we have calculated spectral indices.

Summary

At 5 GHz, about 20 point sources were detected earlier by Glendenning & Kronberg (1986) in the central 800 pc of NGC 2146. Our observations with higher sensitivity and resolution made with MERLIN and the VLA confirms the detection of 18 sources, and resolves 7 of them (Fig.1). Additional 1.6-GHz MERLIN observations disclose 9 sources coincident in position with those detected at 5 GHz, which allows us to derive their spectral indices $\alpha_{1.6}^5$, ($S_\nu \sim \nu^\alpha$). Only 3 sources have indices ($\alpha < 0$) consistent with synchrotron emission from supernova remnants or radio supernovae, while the others have very steep inverted spectra ($\alpha > 0$).

At 5 GHz one of the sources with negative spectral indices (38.9+22.5) presents a partial shell structure with a diameter of ~ 30 pc, though this is not clearly supported by the image of the source at 1.6 GHz (Fig.2).

The nonthermal source 37.6+24.2 has a position offset of $\sim 1''.15$ north-east of the dynamic center of NGC 2146. It has a 5 GHz flux density of ~ 2 mJy and it is not resolved even in a 5 GHz MERLIN map with a resolution of $0''.04$, indicating that it is a very strong and compact “central” object (less than 3 pc diameter). VLBI studies to understand the nature and morphology of this source are ongoing.

Two scenarios to explain the small number of SNRs/RSN found in NGC 2146 with respect to the strength of its starburst are presented and discussed in Tarchi et al. (2000).

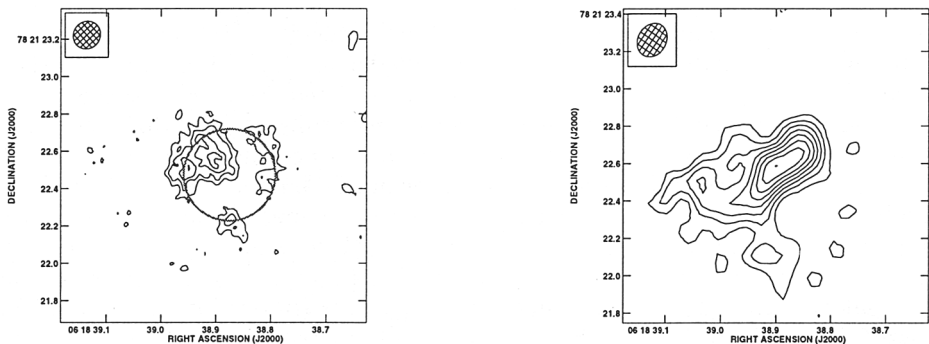


Figure 2. Left panel: source 38.9+22.5 at 5 GHz; the contour interval is 0.05 mJy/beam (2σ) with the first contour at 0.15 mJy/beam (4σ). Right panel: source 38.9+22.5 at 1.6 GHz; the contour interval is 0.05 mJy/beam (2σ) with the first contour at 0.1 mJy/beam (3σ).

Acknowledgments. We would like to acknowledge Dr. Peter Thomasson for his helpful support and Dr. Peter Biermann for useful discussions.

References

- Glendenning B.E., Kronberg P.P., 1986, BAAS 18, 1006
 Tarchi A., Neinger N., Greve A., et al., 2000, A&A, 358, 95