# THE RADIO CORE IN 3C 236

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ABSTRACT: The two-kpc steep-spectrum radio core in the giant radio galaxy 3C 236 has been mapped with 0".1 resolution using the VLA. The core morphology is substantially different from other radio cores and suggests that the flow of energy from the galactic nucleus may be continuous on one side and "blobby" on the other side.

## 1. THE RADIO STRUCTURE OF THE CORE

The radio map of the 2" radio core at 22.5 GHz with 0".1 resolution is shown in Figure 1. The lowest contour level is 1.0% of the peak of 0.4 Jy and the diagonal line shows the direction to the outer radio structure of size 40 arcmin. From comparison with maps at 15 GHz with 0".15 resolution and at 5 GHz with 0".25 resolution, the features of the radio core are:

A. A nuclear core <0".05 (<80 kpc) with $\alpha = 0.15$ ($S = \nu^{\alpha}$);
B. A jet extending to the SE with $\alpha = -0.70$;
C. A "blob" extended perpendicular to the major axis, about one kpc to the NW of the nuclear core, with $\alpha = -0.75$;
D. Some additional low level emission.

The map is in good agreement with an 0".3, 1.6 GHz map (Schilizzi et al. 1981). They show that the SE jet breaks into several components and does curve slightly away from the source axis defined by the large double. They completely resolve out the NW blob but do separate an additional component about 150 pc (0".1) NW of the nuclear core.

Sufficient signal-to-noise for the linearly-polarized maps were obtained with 0".25 resolution at 4.9 and 15 GHz. They show that the electric-vector rotation between 4.9 and 15 GHz is about 30° counter-clock-wise except for the region in the southern part of the NW blob, where the rotation is about 90° CCW. The degree of polarization is about 5 to 15 percent except near the nuclear core and some depolarization is present at 5 GHz. Tentative conclusions about the magnetic field orientation suggest a longitudinal B field along the SE jet and a B field along the periphery of the NW blob. The differential



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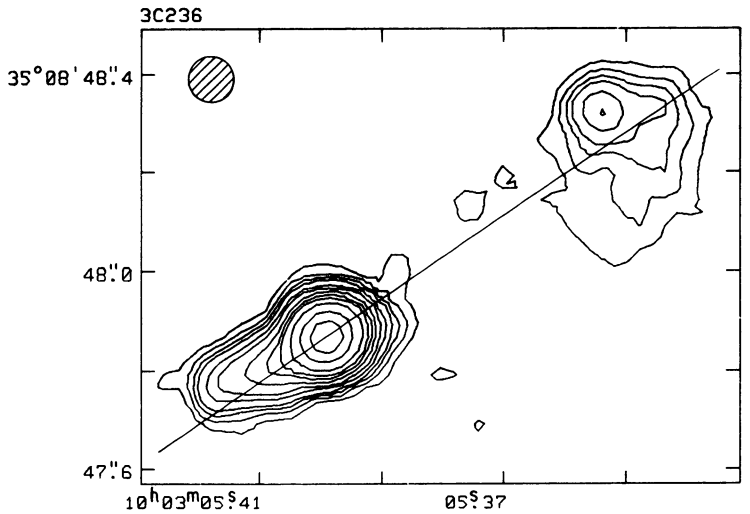


Figure 1: Radio map of the core of 3C 236 at 22.5 GHz with 0.1 arcsec resolution. The peak is 0.4 Jy with contours at 1, 2, 3, 4, 6, 8, 12, 16, 20, 30, 50, 75 percent of the peak. The clean beam is shown in the upper left corner of the map.

Faraday rotation and depolarization suggest (using the usual equipartition arguments) a thermal density of about 3 x $10^{-3}$ $cm^{-3}$ in the NW blob.

## 2. CONCLUSIONS

A. An opaque radio core of 0.4 Jy lies at the nucleus of 3C 236.

B. The radio emission has a different morphology on each side of the radio core; jet-like to the SE and blob-like to the NW. This suggests that the more collimated, continuous flow of energy is occurring towards the SE. This is consistent with the morphology in the extended 40 arcmin radio emission, which shows a hot spot in the SE suggestive of the termination of a flow. The extended emission to the NW has little fine-scale structure suggestive of little collimated flow (Strom and Willis, 1980).

C. The higher thermal electron density in the NW blob may account for the disruption of energy flow in this direction.

D. Although the extended 40 arcmin source is straight (<3° bend) the two-kpc radio core shows deviations from linearity of over 10°. This suggests that the ultimate collimation of the extended source is not controlled by the inner few kpc but by the outer regions of the galactic environment.

## REFERENCES

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