

# 20CM OBSERVATIONS OF 3C441

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## Abstract

We made radio observations of the radio galaxy 3C441 using the VLA in A configuration at 20cm. We measured polarized intensity of structures in 3C441, and found fractional polarizations of 10% - 20%. Comparison of the length of the radio jets and position of known structures did not significantly differ from earlier measurements, providing an upper bound of on the velocity of material in the jets.

## Observations

We observed with the VLA in A-array configuration in a 2x50 MHz bandwidth by using bandwidth synthesis of two IFs at 1.4649 GHz and 1.3851 GHz. This gave us a synthesized beamwidth of 1.4" x 1.4". Observations are summarized in Table 1.

We were able to resolve extended structure in 3C441 at 20cm, and produce maps of polarized intensity (Stokes  $\sqrt{Q^2 + U^2}$ ) (see figures 1 and 2). We determined fractional polarization for the north and south radio lobes, as well as for shock structures labeled A, C, and D as in previous literature.

TABLE 1: SUMMARY OF OBSERVATIONS

<u>Source</u>	<u>RA</u>	<u>Dec</u>	<u>Int. Time(min)</u>	<u>comment</u>
0137+331	01:37:41.3	33:09:35.1	10.7	Flux cal.
2236+284	22:36:22.5	28:28:57.4	8.0	3C441 Phase cal.
0038+416	00:38:24.8	41:37:06.0	8.8	M31SNR Phase cal.
M31SNR	00:44:24.6	41:54:22.3	60.0	
3C441	22:06:05.2	29:29:18.5	60.2	

## Calculations

We obtained flux measurements for structures in 3C441 by obtaining the total flux in a box, then dividing this flux by the number of pixels per beam. Fractional polarization was obtained by measuring the intensity of polarized flux in the same box.

We determined the angular size of the radio lobes from the approximate center of the radio galaxy, which is determined from HST images and coincides approximately with the C structure in our radio images. We then used a distance of 1500 Mpc, which coincides with a redshift of  $z=0.7$ , to determine physical sizes.

## Results

Distance to M31 is  $2.2 \times 10^6$  Ly. Using this distance and an integrated flux of 7.5 mJy, we calculated a luminosity of  $1 \times 10^{17}$  W Hz<sup>-1</sup>, which is reasonable when compared with other supernovae in this region.

Comparison of the position of C and D structures in 3C441 with those obtained by Fernini et. al. (1997) reveals no significant motion of material. A summary of measurements taken on 3C441 is given in Table 2 below.

TABLE 2: 3C441 MEASUREMENTS

Feature	LAS(as)	LAS(kpc)	Flux (mJy beam <sup>-1</sup> )	% pol.
North lobe	14"	100	3.20	7.8
South lobe	24"	171	2.23	18.4
A			4.64	13
B			6.33	14
C			3.76	9
D			16.64	9

## Summary

Our measurements of fractional polarization of the structures in 3C441 agree closely with those obtained by Fernini et. al. We also obtained fractional polarization measurements for the B structure, which have not been reliably obtained before.

Further cleaning of these images may reveal deeper structure in the radio lobes, which may provide better correlation of polarized intensity. A longer survey of this galaxy would also provide the opportunity to analyze the direction of polarization. This would help to resolve some of the dispute in the classification of this object.

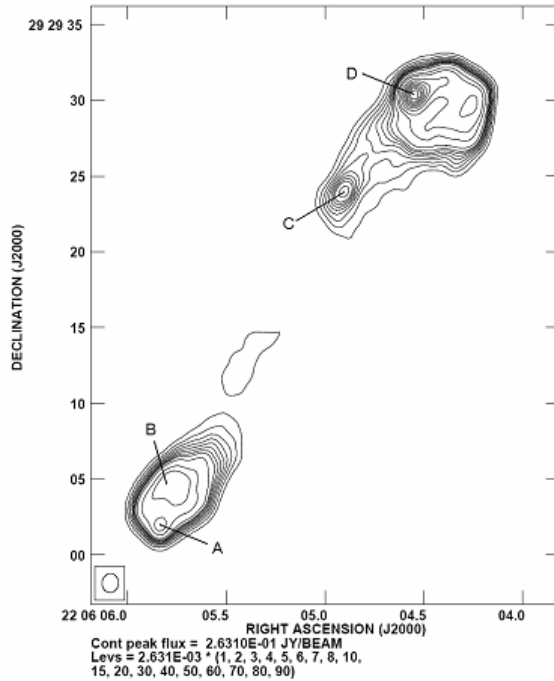


Figure 1: 20cm total intensity map of 3C441

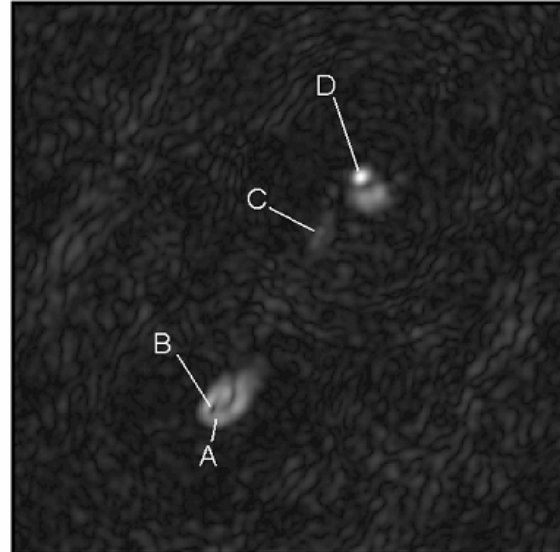


Figure 2: Polarized intensity map