SECOND EPOCH OF SIMULTANEOUS λ3.6 AND λ13 CM OBSERVATIONS OF THE PAIR OF QUASARS 1038+528 A,B

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1. INTRODUCTION

On 1983 May 10-11 we undertook simultaneous λ3.6 and λ13 cm Mark III VLBI observations of the quasars 1038+528 A,B. Our experimental conditions (i.e., synthesized band, uv-coverage, etc.) were almost identical to those we used on 1981 March 17-18. Thus, we could make a direct comparison of the results from both epochs. We were especially interested in:

a) Looking for structural changes in quasars A and B (Marcaide et al. 1985);
b) Determining accurately the plane-of-the-sky components of the ~33 arcsecond separation between quasar A and quasar B (Marcaide and Shapiro 1983); and
c) Confirming our previous discovery of a wavelength dependence of the location of the peak of brightness of the core of quasar A (Marcaide and Shapiro 1984).

2. RESULTS

a) We found no changes in the quasar 1038+528 B. The model obtained for this quasar from the 1981 (epoch 1) data (Marcaide et al. 1985) fits the 1983 (epoch 2) data to within the latter's uncertainties.

b) The quasar 1038+528 A showed the predicted evolution (Marcaide et al. 1985): A component ejected from the core circa 1980 was seen moving in the NE direction at an apparent speed more than three times the speed of light ($z=0.678$, $H_0=100$ km s^{-1} Mpc^{-1}, $q_0=0.5$). The

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position angle of this component with respect to the core was larger than in epoch 1 and was approaching the position angle of the large-scale structure. The trajectory suffered a bend of about 10 deg. (See Figure 1.)

c) We confirmed the wavelength dependence of the location of the peak of brightness of the core of quasar A.

d) At λ3.6 cm, the sky position of the peak of brightness of the core of quasar A with respect to a position on quasar B (the same position for both epochs) appears to have moved northwards by about 70 μas along PA -14 deg from epoch 1 to epoch 2. At both epochs the precision is better than 4 μas. We are carrying out extensive tests to determine whether this difference could arise from some effect not yet accounted for. If this 70 μas difference is not an "artifact," then it would suggest that the point where the jet becomes optically thin has moved by that amount in two years. It also appears that the jet curves by about 35 deg from its origin to its outer structure.

e) Combining the above result with astrometric results obtained since 1979, we conclude that the core of quasar A cannot be moving with respect to quasar B faster than about 40 μas/yr.

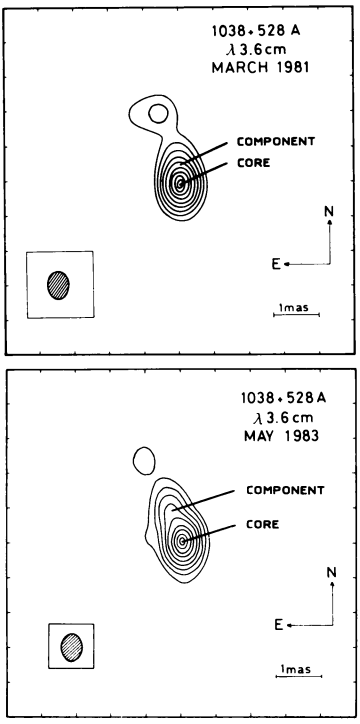

Figure. 1. Evolution of the structure of the quasar 1038+528 A. A component is moving out of the core. The core itself appears (nearly) stationary with respect to the quasar 1038+528 B. Contours in both maps correspond to 2, 5, 10, 18, 30, 50, 65, 85, and 95% of the peak of brightness.

3. CONCLUSIONS

The quasar 1038+528 B (z=2.296), not detectably changed in two years, is a good reference for studying the internal motions in quasar 1038+528 A. The apparent superluminal motion of a feature in quasar A takes place with respect to a (nearly) stationary core; its proper motion is bounded from above by about 40 μas/yr. The wavelength dependence of the location of the peak of brightness of the core of quasar A has been confirmed.

4. REFERENCES

Marcaide, J.M. and Shapiro, I.I. 1983 A.J. 88, 1133.
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