A 10 Station VLBI Map of 3C147 at 1661 MHz

R. S. Simon[1,4], A. C. S. Readhead[2], and P. N. Wilkinson[3]
[1]E. O. Hulburt Center for Space Research, Naval Research Laboratory, Washington D. C. 20375
[2]Owens Valley Radio Observatory, California Institute of Technology, Pasadena, California 91125
[3]Nuffield Radio Astronomy Laboratories, Jodrell Bank, Macclesfield, Cheshire, SK11 9DL United Kingdom
[4]NRC/NRL Cooperative Research Associate

ABSTRACT

The quasar 3C147 was observed in October 1982 with a ten-station VLBI interferometer in an effort to search for possible superluminal motion (Simon et al. 1983) in the core. Previous observations, in 1976, had revealed that the core consisted of two compact components embedded in a larger halo. The new high quality map reveals that this double structure has disappeared and it is not possible to interpret the structural changes unambiguously in terms of an expansion or contraction.

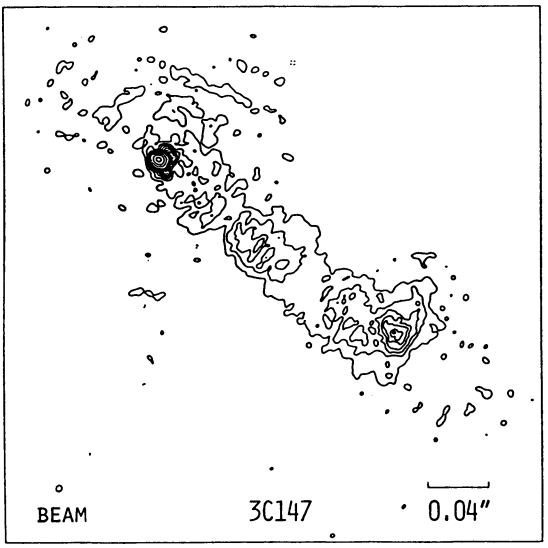
DISCUSSION

We have made a 10-station VLBI map of 3C147 at 1661 MHz (see Fig. 1). The details of the observations and data reduction will be given elsewhere (Simon, Readhead, and Wilkinson, in preparation). The global fringe fitting technique of Schwab and Cotton (1983) was used to extract the maximum possible information from the video tapes, and the resulting map is shown in Fig. 1. The excellent (u,v) coverage afforded by these observations has enabled us, for the first time, to map the 0".2 jet with the full resolution at this frequency. We believe that this is the best VLBI map, in terms of dynamic range and number of pixels, produced thus far.

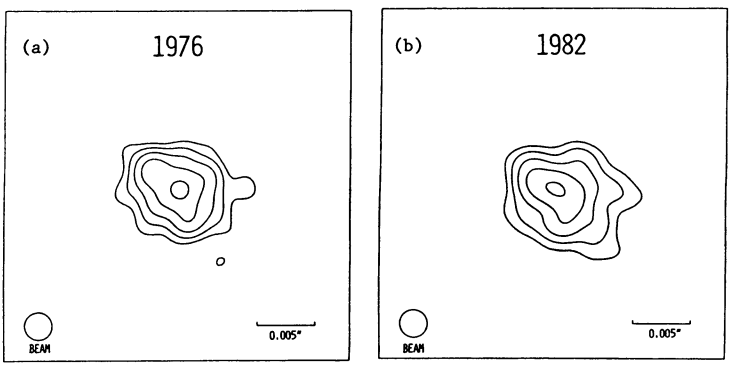
In Figs. 2a and 2b we show maps of the core from the 1976.74 (Readhead and Wilkinson 1980) and 1982.77 observations, respectively. At the lowest contour levels the core is slightly larger at the later epoch, especially in position angles -70 degrees and -150 degrees. We note that the maps of Preuss et al. (in preparation) at 5 GHz suggest an increase in size of the core in pa -90 degrees. It is not possible on the basis of these observations to discriminate between an expansion of the outer regions of the core and a brightening of stationary components. In 1976 the core could be modelled as a simple 2.6 milliarcsecond separation double, embedded in a halo. This structure can be seen in Fig. 2a at the higher contour levels as a double, or long ridge of emission. This structure has been replaced in the 1982 map by a simple symmetric broad peak. The change could be due to a contraction or simply to variations in brightness of different parts of the core.

R. Fanti et al. (eds.), VLBI and Compact Radio Sources, 111–112.

REFERENCES
Readhead, A. C. S. and Wilkinson, P. N.: 1980, Ap.J. 235, pp. 11.
Schwab, F. R. and Cotton, W.D.: 1983, A.J. 88. pp. 487.
Simon, R. S. et al.: 1983, Nature 302, pp. 487.



1. Map of 3C147 at 1661 MHz. Contour levels are -5, 5, 15, 25, ..., 115, 230, 460, 900 mJy/beam. The restoring beam used is an elliptical gaussian-shaped beam, with major axis 4.2 milli arc sec, minor axis 3.7 milli arc sec, with the major axis lying along position angle -45 degrees.



2. Maps of the core of 3C147. Contour levels are 0.02, 0.04, 0.08, 0.16, 0.32, and 0.64 Jy/beam in each map. The restoring beam used was a circular gaussian of 2.4 mas FWHM. (a) The 1976.74 core map of Readhead and Wilkinson. The peak brightness in this map is 0.78 Jy/beam. (b) The core from the 1982.77 map (the full map is shown in fig. 1); the peak is 0.72 Jy/beam.

https://doi.org/10.1017/S0074180900077792 Published online by Cambridge University Press