NEW RADIO OBSERVATIONS OF 'OLD FAITHFUL'

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We present new arcsecond-scale radio images of the gravitational lens system 0957+561 A, B. Observations at 1.6GHz were made in 1991 October with the VLA in A/B configuration with a resolution of 1.5 arcsec (Fig. 1, left). The lowest contour is 0.37 mJy/beam. In addition to the compact A and B image components, and the familiar NE/SW radio double-lobe structure surrounding image A, this map shows two interesting new features:

(a) a long, thin feature extending south and west from the NE lobe, some 10 arcsec in extent, confirming the detection by Avruch et al. (1994). It is reminiscent of the 'arc' features seen in optical images of lensing clusters, and hopefully can be used to constrain models of the cluster mass distribution. (For the superstitious, one can note that the position angle of the arc, 17°, is identical to that of the VLBI jet in image B, a few arcseconds to the west.)

(b) a low-level extension of the B image in the NW direction. We are not aware that this has been seen before. A possible interpretation of this feature is a continuation of the jet emission seen in VLBI images of B, whose counterpart in A is seen in higher resolution maps. The change of position angle between the VLBI and arcsec-scale jets would indeed have opposite parities in the A and B images.

Observations at 408 MHz with MERLIN were made in 1995 January. We present 2 maps; the first (Fig.1, right) uses natural weighting of the visibility function, and has a resolution of 1.5arcsec. This is a preliminary map, but we can see a 'hint' of emission from the arc, at the position of the brightest peak in the VLA 1.7GHz map. The lowest contour level is 1.96 mJy/beam. We deduce that the spectrum of the arc cannot be very steep (e.g. -1.0) or the arc would be more easily detected. The second MERLIN map (Fig.2)

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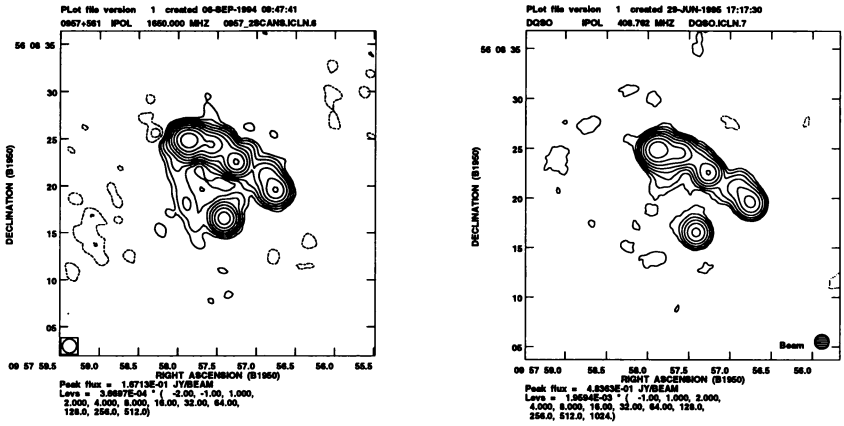

Figure 1. 1.5arcsec maps of 0957+561 at 1.7GHz (VLA, left) and 408MHz (MERLIN, right)

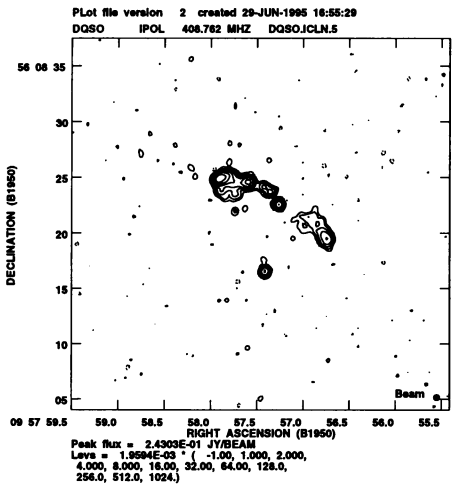

Figure 2. MERLIN map of 0957+561 at 408MHz with 0.5arcsec resolution.

uses uniform visibility weighting, and has a resolution 0.5arcsec. The jet extension of image A, curving towards the NE lobe structure is clearly visible, although any counterpart in B is not seen, and must therefore be fainter at 408 MHz.

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References

Avruch, I.M., et al., 1993, BAAS, 25, 1403