Low frequency radio imaging of extragalactic radio sources

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1. Introduction

A new imaging software project Astro Space Locator (ASL for Windows) developing at the Astro Space Center is presented. The ASL software is oriented towards the processing of the post-correlation data obtained by using the aperture synthesis method and, in particular, VLBI and Space VLBI. ASL is intended for image processing of data obtained from any modern VLBI instrument including the future SVLBI project Radioastron and the Low Frequency VLBI Network (LFVN) currently developed in the Astro Space Center. ASL software abilities are demonstrated for the data processing of the following VLBI observations at 327 and 1665 MHz organized at the Astro Space Center: ED005, EA009, INTAS98-5. The sequence of data processing is the following : ASL Amplitude Calibration, ASL Fringe Fitting, ASL Editing, ASL Imaging. ASL description is available on the WWW site : *http : //platon.asc.rssi.ru/DPD/DPD.html*

2. Observations and data processing results

ED005 and EA009 experiments were organized at λ92 cm in October 1995. The telescopes involved in the observations were Noto, Jodrell, Westerbork, Crimea and also Urumqi. We have used the advanced ASL software to reconstruct the images of quasars 3C345 (Fig. 1b) and 3C309.1 (Fig. 1f) for poor (u,v) coverage (see Fig. 1a and Fig. 1e). Hybrid mapping with a regularization procedure had been used to reconstruct the (u,v) plane (Likhachev et al. 1998). The structure of 3C345 agrees with images of 3C345 at other frequency ranges (Matveenko et al. 1996, Ros et al. 2000). Another 92 cm image has been obtained for 3C84 (ED005). The ASL image is shown in Fig. 1d. This source has similar structure at 8.4 GHz (Walker et al. 1994). We have two images of quasar 3C309.1 (for the wavelength 92cm and 18cm). This source had been observed in EA009 (see Fig. 1e and Fig. 1f) and INTAS98-5 (see Fig. 1g and Fig. 1h) sessions. The telescopes involved in the INTAS98-5 (1998 November)observations were Bear Lakes, Puschino, Svetloe and also Green Bank RT-43 antenna. We are able to resolve the compact structure of 3C309.1 due to great baseline length (Fig. 1h) and the ASL (u,v) plane reconstruction procedure.

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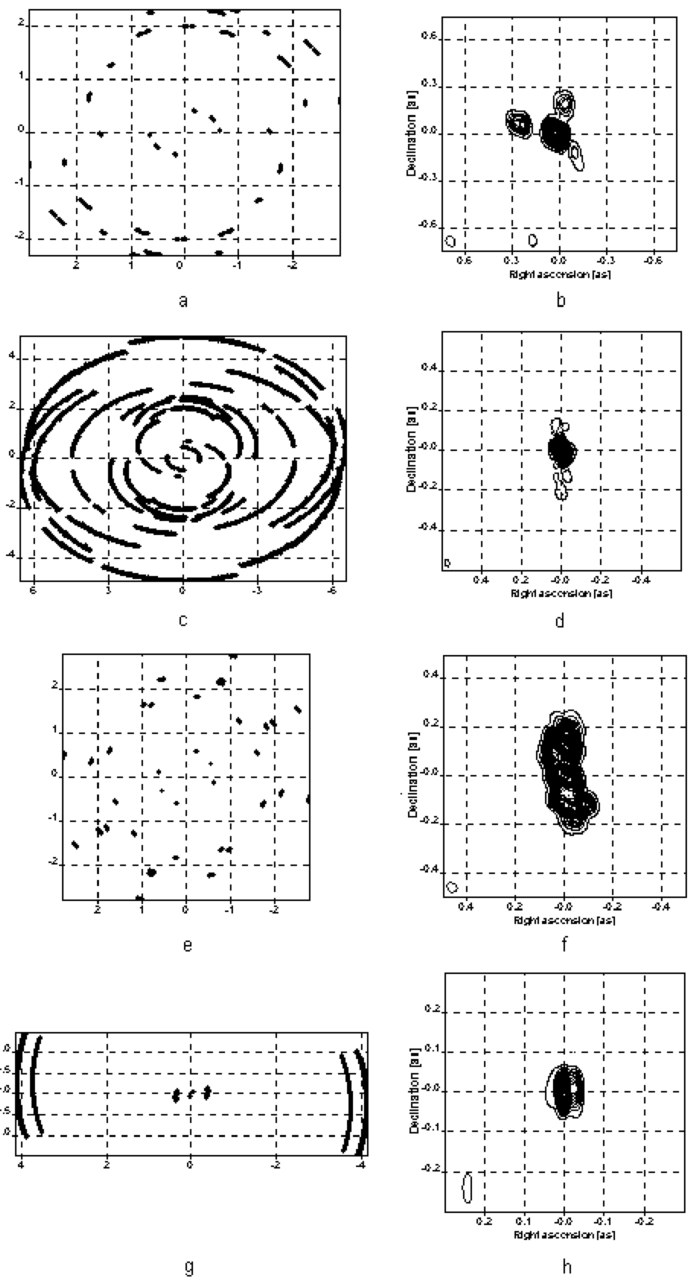

FIGURE 1. (u,v) plane coverages (left) and clean models (right) for sources 3C345 (92 cm), 3C84 (92 cm), 3C309.1 (92 cm) and 3C309.1 (18 cm)