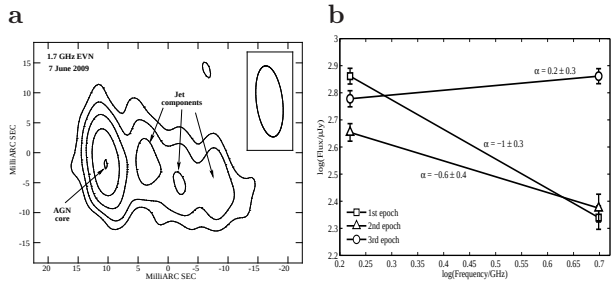

Fig. 1. (a) EVN image at 1.7 GHz of the innermost nuclear region of IC 694, evidencing the core-jet morphology typical of AGNs. (b) Spectral index evolution of the nuclear zone in IRAS 23365+3604 through three epochs of EVN observations.

tions covering different frequencies and times, since we can then retrieve precious information about the nature of the sources.

2.1. *Arp 299*

Arp 299 is the merger at a distance of 45 Mpc of two galaxies: IC 694 and NGC 3690. About half of the system's total $L_{\rm FIR}$ is concentrated in IC 694, as well as ≈70% of the total 5 GHz radio emission (see e.g., Neff et al. 2004). Hence, IC 694 is an excellent target to probe its CCSN rate and SFR. In fact, high-angular resolution observations of IC 694 have shown that this core contains a wealth of compact components within its innermost nuclear region (Neff et al. 2004; Ulvestad 2009; Pérez-Torres et al. 2009). To characterise the compact components found in 5 GHz EVN images from 2008, Pérez-Torres et al. have been monitoring IC 694 and discovered a dusty-buried Low Luminosity AGN (LLAGN) among the 26 non-thermal sources of the nuclear region (Pérez-Torres et al. 2010). The discovery of the coexistence of a strong SB and a LLAGN (see Figure 1a) is a stunning result. But more important is the fact that in this case, the heating mechanism is vastly provided by a powerful SB.

2.2. *IRAS 23365+3604*

IRAS 23365+3604 is an advanced merger at a distance of 252 Mpc. This is one of the most brightest and farthest ULIRGs in the local Universe. A CCSN rate of ≈5 SN/year is inferred from its high luminosity. We have performed multi-epoch, -frequency EVN observations toward this system. A nuclear SB of size ≈200 pc is revealed in our images. With the current resolution we cannot resolve out the extended emission and detect compact sources (such as SNe). However, analysing the flux density variation of the nuclear region, it is possible to infer the variation in flux of sources therein and/or appearance of new sources (SN) which would be seen first at higher frequencies and later at lower frequencies (Weiler et al. 2002), see Figure 1b where we show the evolution of the spectral index from the nuclear region. For further details, we refer the reader to Romero-Cañizales et al., in preparation.

3. DISCUSSION

We have shown some of our results obtained with the EVN. This is an excellent tool which has aided the discovery of the long-sought AGN in IC 694 and to obtain very deep and high-angular resolution radio images of one of the most distant ULIRGs in the local Universe. In the two examples we show, we see how important is to have high-angular resolution: at the distance of Arp 299 it is possible to resolve out the extended emission, whereas the same is not possible in IRAS 23365+3604, which is almost six times farther away. Still, a similar scenario is expected in the heart of this object.

This work is based on observations with the EVN. *The European VLBI Network is a joint facility of European, Chinese, South African and other radio astronomy institutes funded by their national research councils.* We acknowledge support from grant AYA2009-13036-C02-01, sponsored by the Spanish MICINN. This work has also benefited from research funding from the European Community Framework Programme 7, Advanced Radio Astronomy in Europe, grant agreement no.: 227290. Thanks to JIVE and especially to Zsolt Paragi and Bob Campbell for their invaluable help in this project.

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