

Evolution Of Compact Radio-Loud AGNs

M. Kunert-Bajraszewska¹, A. Marecki¹, and P. Thomasson²

¹Toruń Centre for Astronomy, N. Copernicus University, PL-87-100 Toruń, Poland

²Jodrell Bank Observatory, University of Manchester, Macclesfield, Cheshire, SK11 9DL, UK

Abstract. Multifrequency MERLIN, VLBA and VLA radio observations of Compact Steep Spectrum (CSS) radio sources are discussed. According to the theory of the evolution of CSS sources, they are the precursors of larger/older radio-loud AGNs. However, our observations reveal a small number of strong candidates for compact faders, which support an alternative idea that some small-scale, radio sources are short-lived phenomena.

Keywords. galaxies: active, galaxies: evolution

1. Introduction and Results

The Gigahertz-Peaked Spectrum (GPS) and Compact Steep Spectrum (CSS) sources make up a significant fraction of radio-loud AGNs. Their projected linear sizes are less than 20 kpc ($H_0 = 100 \text{ km s}^{-1} \text{ Mpc}^{-1}$ and $q_0 = 0.5$) and can be explained by an evolution theory. According to this [6], GPS sources may represent the earlier stages of CSS objects, which are the precursors of older Large Symmetric Objects (LSOs). However it has been suggested [4, 3] that a lack of stable fuelling from the black hole can inhibit the growth of a radio source so that it will never reach the LSO stage, at least in a given phase of its activity. Consequently, a large number of fading compact CSS/GPS sources could be observable, although re-ignition of activity in such objects is not ruled out.

A search has been made for compact, fading objects among 60 candidate CSS sources selected from the VLA FIRST catalogue [7]. Initial observations of all the candidates with MERLIN at 5 GHz have led to the selection of several distinct groups of objects for further study with MERLIN, the VLA and VLBA [1, 2, 5, 3]. Most of these sources have morphologies similar to the strong and more "classical" CSS objects (two symmetric edge-brightened lobes with well defined hotspots, or core-jet morphology), but the observations have also revealed the existence of more exotic objects which are strong candidates for compact faders [2, 5, 3]. The double sources, 1542+323 [2] and 0809+404 [3], are the best examples of probable faders based upon their radio morphologies. They have diffuse structures with steep spectra, which appear to be fading away at higher frequencies. No compact features are visible, neither hotspots nor cores.

Acknowledgements

M. K-B. is supported by MNiSW under grant 1 P03D 008 30.

References

- [1]Kunert, M., *et al.*, 2002, A&A, 391, 47.
- [2]Kunert-Bajraszewska, M., *et al.*, 2005, A&A, 440, 93.
- [3]Kunert-Bajraszewska, M., *et al.*, 2006, A&A, 450, 945.
- [4]Marecki, A., *et al.*, 2003b, PASA, 20, 46.
- [5]Marecki, A., *et al.*, 2006, A&A, 449, 985.
- [6]Readhead, A. C. S., *et al.* 1996, ApJ, 460, 612.
- [7]White, R. L., *et al.*, 1997, ApJ, 475, 479.