PRELIMINARY VLA SNAPSHOTS OF SOUTHERN RADIO SOURCES FROM THE PARKES-MIT-NRAO (PMN) SURVEY

A.FLETCHER, B.BURKE, S.CONNER, L.HEROLD, A.COORAY, D.HAARSMA, F.CRAWFORD AND J.CARTWRIGHT
Massachusetts Institute of Technology
26-344 M.I.T., 77 Mass. Ave., Cambridge, MA 02139, USA.
EMAIL: bfb@maggie.mit.edu

Abstract. Selection criteria for 1800 MIT-VLA snapshots of PMN radio sources are described, and 6 new MG & PMN lens candidates are presented.

1. Sample Selection

The Parkes-MIT-NRAO (PMN) Southern Hemisphere Sky Survey revealed 36,640 sources over $\Omega = 4.51$ sr, and is $> 95\%$ complete and $> 90\%$ reliable down to $S_{4.85GHz} \approx 35$ mJy (Griffith et al. 1995). We have made 1800 0.25″-resolution 8.4 GHz VLA snapshots of PMN sources ($S_{4.85GHz} > 90$ mJy) in the $-30° < \delta < 0°$ strip ($|b| > 10°$). This sample is essentially complete down to $S_{4.85GHz} \approx 200$ mJy, and is divided roughly equally into a flat-spectrum sample ($S_\nu \propto \nu^{-\alpha}; \alpha < 0.5$), and a purely flux-limited one. Our Northern VLA campaign in the $0° < \delta < 37°$ strip of the MIT-Greenbank (MG) Surveys (Griffith et al. 1991) produced 5 confirmed lenses from $\approx$ 4000 snapshots: MG2016, MG1131, MG0414, MG1654 and MG1549.

2. New Results

Improvements in the MIT mapping pipeline (Conner et al. 1992) have uncovered several more good candidates, yielding a lensing frequency of $\approx 1/500$. Our initial candidate selection is by radio morphology. The 6 most promising cases from a new crop of 8.4 GHz MG & PMN snapshots are shown in Fig. 1. Optical R band imaging with the Michigan-Dartmouth-MIT 1.3m telescope has secured identifications ($R > 22.5$) for all 6 candi-

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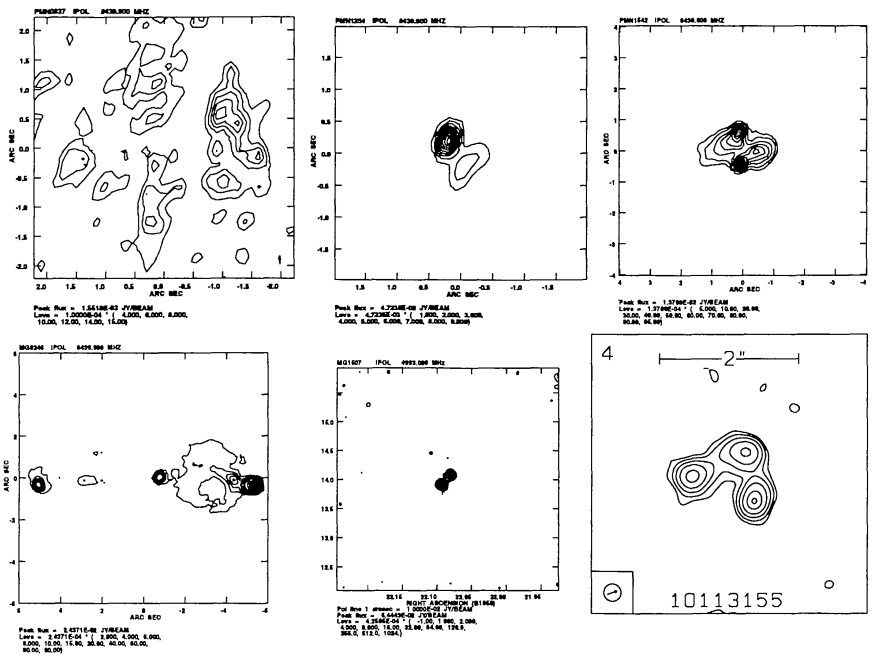

Figure 1. VLA 8.4 GHz plots of 3 new PMN & 3 new MG gravitational lens candidates.

dates. MG0246 is almost certainly an Einstein Ring. MG1507 is just one of $\approx$ 130 'close doubles' ($0.25'' < \theta < 2.0''$) in the 8.4 GHz database. It is not yet understood what these tiny radio galaxies are physically; it is likely that they are the lobes of distant, young or 'frustrated' classical doubles, but perhaps a few are doubly-imaged background radio sources. Theoretical predictions (Turner et al. 1984) that small angular size lenses should exist have been corroborated by several recent discoveries, e.g. the 0.33″ ring B0218+35.7 (Patnaik et al. 1993). Further optical imaging and spectroscopy is required to investigate the lensing hypothesis for these new MIT candidates.

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