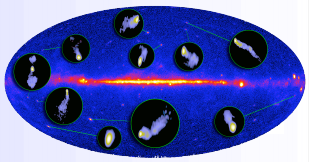
Radio and gamma properties of the 2 cm Survey and MOJAVE Samples

Eduardo Ros *for the MOJAVE collaboration*



The *Fermi*/LAT detection rate and the multi-band properties of the radio selected 2cm Survey sample (171 representative AGN) is presented in contrast to the MOJAVE sample (statistically complete, 135 AGN).

The MOJAVE and the 2cm Survey samples

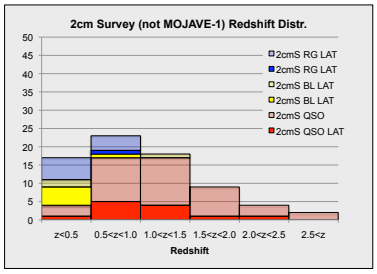
The **2cm VLBA Survey** observed from 1994 to 2002 a set of **171** Quasars, BL Lac objects, and radio galaxies, selected to be representative of the compact AGN radio population (see e.g., Kellermann et al. ApJ, **609**, 539, (2004); images in Kellermann et al, AJ **115**, 1295 (1998) and Zensus et al. AJ **124**, 662 (2002), kinematical results of the parsec-scale jet features in Kellermann et al. ApJ, **609**, 539 (2004) and Ros et al. (in prep.)). This sample was redefined to be statistically complete, with **135** objects (including 96 sources from the 2cm Survey), with continued monitoring observations from 2002 with the name of the **MOJAVE-1** program (see Lister et al. AJ **137**, 3718 (2009) for a description of the images, and Lister et al. (in press, arXiv:0909.5100) and Homan et al. (in press, arXiv:0909.5102) for kinematical results).

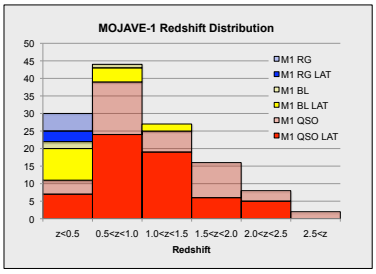
The Large Area Telescope (LAT) onboard the *Fermi Gamma-ray Space Telescope* has detected a big fraction of the AGN present in these samples. The right hand side diagram shows the detection rate including optical identifications.

First results on the gamma-radio relationship have been published for the statistically complete sample, in a first instance for the LAT Bright AGN Source (LBAS) 3-month list (see Kovalev et al. ApJ **696**, 17L (2009), Lister et al. ApJ **696**, 22L (2009) and Pushkarev et al. A&A (in press, arXiv:0910.1813)) and in this conference for the eleven-month source (EMS) list (see other MOJAVE posters).

79 prominent AGN from the 2cm Survey are not members of the statistically complete sample, but their radio properties from our programme can as well be compared with the Fermi/LAT findings. **19 out of those are present at the 1-year catalog.** Preliminary radio results for these sources are shown below.

Redshift Distribution

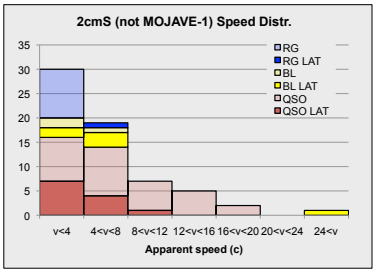


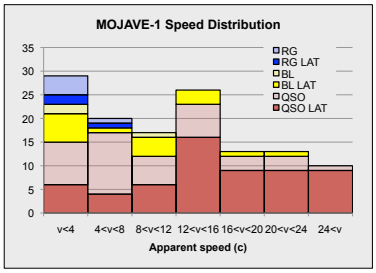


Difference in redshift distribution between the statistically complete sample (left) and the remaining sources from the 2cm Survey (right). Apart from the much lowest detection rate, we notice a relative overpopulation in the 1-1.5 redshift range for the sources from the 2cm Survey.

Apparent Speed Distribution

Distribution of the maximum jet speeds for both sets of sources. Notice that the faster jets (above 10c) belong favourably to sources detected by LAT, and that in general all sources from the 2cm Survey not contained in MOJAVE have slower jets.





Collaborators

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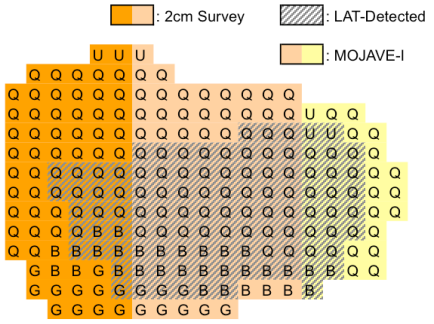
Detection fraction for the AGN samples

Below are shown the *Fermi*/LAT detections for the 2cm Survey and the MOJAVE-I samples. Each cell corresponds to one AGN, where the optical spectral classes are marked. The shaded cells represent LAT detections (sources at present at the 1-year catalog developed by the LAT team).

Fermi/LAT Detections of 2cm Survey & MOJAVE-I Samples

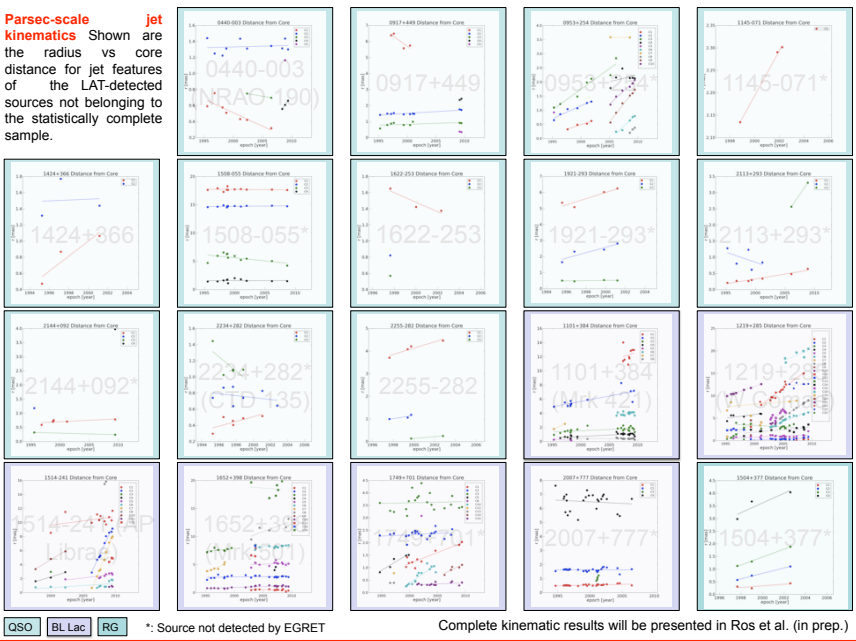


G: Radio Galaxy Q: QSO B: BL Lac U: Unidentified

Set	Total	LAT det.	LAT Frac. QSO	LAT Frac. BL Lac	LAT Frac. Radio Gal.
MOJAVE-I*	135	85	60%	86%	38%
2cm Survey	171	82	46%	79%	21%
MOJAVE-I and 2cm Survey	96	63	65%	84%	38%
MOJAVE-I not 2cm Survey	38	22	52%	100%	-
2cm Survey not MOJAVE-I	79	19	22%	67%	8%

*: MOJAVE-I results are provided in Lister et al. (talk) and several posters

Parsec-scale jet kinematics Shown are the radius vs core distance for jet features of the LAT-detected sources not belonging to the statistically complete sample.



QSO BL Lac RG *: Source not detected by EGRET

Complete kinematic results will be presented in Ros et al. (in prep.)

Discussion and conclusions

The gamma detection rate of the MOJAVE sample is much higher than for the sources of the 2cm Survey not belonging to the complete sample. The latter sources have in general slower jets. Notice that the MOJAVE-1 sample is selected on the base of compact, beamed (VLBI) emission, and that the gamma-ray emission is correlated with compactness (Kovalev et al. ApJ **696**, 17L (2009)).

BL Lacs (seen with beamed jets) are more favourably detected than QSOs, in the same rate for both samples.

The speeds for gamma-detected sources at the MOJAVE-1 sample are higher than for the non-detected ones, especially in the case of the QSOs. Notice that the faster the jets are, the more sources have been gamma-detected (9 out of 10 for v>24c).

70 % of the quasars of the 2cm Survey not belonging to MOJAVE-I were not detected in gamma-rays, which shows a big difference in the parent population from the statistically complete sample and the additional sources. Notice as well that the MOJAVE-1 sample was selected from active sources since the mid 1990s. Sources which were active before and not at present would emit in gamma-rays less likely.

Acknowledgments

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