

STATISTICAL PROPERTIES OF LOBES AND JETS. I. IN
GALAXIES WITH KNOWN HUBBLE TYPES.

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ABSTRACT. We have searched in the literature for lobes and jets reasonably well defined in the radio continuum. As a first step we have selected those that are related to NGC galaxies with the aim of exploring correlations of the jet and lobe properties with other physical properties of the associated galaxies.

Our preliminary study is based on 20 objects which satisfy our selection criteria; 85% of these show bi-polar lobes, while the remaining 15% are poorly defined. Thus the frequency of bi-polar configurations of lobes is decidedly high. Further, 53% of bi-polar lobes sensibly lie near the line of nodes, hence close to the plane of symmetry of the galaxy, with 22% of these showing equal extension on either side of the nucleus; 35% of the lobes lie nearly perpendicular to the symmetry plane.

As to jets, they are observed in 11 galaxies of our sample; in 35% of these objects the jets, running through the middle of the lobes, are bi-polar; 25% of them are close to the line of nodes and the remaining jets tend to be oriented nearly perpendicular to the plane of symmetry, hence close to the axis of symmetry. Seven of the jets of our list are one-sided with 40% of them close to and 60% nearly perpendicular to the line of nodes of the galaxy.

We have explored possible relationships of characteristics -such as sizes of lobes and jets, their symmetry, energetics and orientation within the galaxy- to the overall morphological and physical parameters of the parent galaxies. Our material however scanty to draw definite statistical conclusions points to some general trends. We mention below a few such trends:

Lobes in Seyfert and "ordinary" spiral galaxies show a tendency to be oriented close to the symmetry plane as against the more energetic ones, namely in E and cD galaxies. This agrees with the finding that lobes which have extensions less than 100 kpc tend to be near the symmetry plane of the galaxy. Thus we may tentatively state that as the energy contained in the lobes decreases their orientation approaches the plane of symmetry of the galaxy. The same can be said about jets. Lobes are, as a rule, bi-polar. In some cases they contain 1 or 2 jets. Their jets follow the same trend. Our data suggest that the absence of a counter jet is not necessarily caused by Doppler boosting. It appears that the sidedness of a jet may be an intrinsic property of the active nucleus.

Further discussion of the statistics of lobes and jets will be given in a forthcoming paper.

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