THE INFLUENCE OF SELECTION EFFECTS ON THE PROPERTIES OF BL LACS

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The fact that the recognition of BL Lacs always requires optical confirmation, regardless of whether the objects were first selected in the radio, or X-ray frequencies means that deep surveys will miss some objects simply because the optical emission from the host galaxy outshines that of the BL Lac. In particular, the deeper the survey, the more difficult it will become to recognize low luminosity BL Lacs in the nuclei of luminous galaxies. This recognition effect will modify the intrinsic distribution of objects, and influence their statistical properties in general.

We have developed a method to quantify this recognition problem which enables us to predict source counts, redshift distributions, $< V/V_{max} >$, and percentage of missed objects for flux limited samples. Many of the predicted features appear in the observed distributions of X-ray and radio selected BL Lacs. In particular, comparisons between the predicted and observed properties of BL Lacs selected from the EMSS X-ray survey suggest that this BL Lac sample is only 80% complete, unless there is a lower limit cutoff in BL Lac luminosities. Although the redshift dependance of the recognition problem produces spurious cosmological evolution, the predicted value of $< V/V_{max} >$ for the EMSS sample of BL Lacs is not sufficient to account for the strong negative cosmological evolution found for these objects. However, the fact that the recognition problem does mimic some negative evolution means that such strong intrinsic cosmological evolution is not required for the BL Lacs of this sample.

As deeper surveys become available we predict that the above selection effect will become more significant. It should therefore be taken into account before comparisons between samples are made, and conclusions about the statistical properties of BL Lacs are reached.

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