

# The Radio Variability of Gamma-Ray Blazars

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# Abstract

Since late 2007, we have regularly monitored over 1100 systematically selected blazars at 15 GHz using the Owens Valley Radio Observatory 40 m radio telescope. The number of sources in the program has grown to nearly 1600, including all the active galactic nuclei associated with *Fermi* Large Area Telescope (LAT) gamma-ray point source detections north of our declination limit of  $-20^\circ$ . Here, we describe the first 42 months of this program, including the design and implementation of an automated data reduction pipeline and a MySQL database system for storing the reduced data and intermediate data products. Using the “intrinsic modulation index,” a maximum-likelihood method, we estimate the variability amplitudes for 1413 sources from their radio light curves and compare the properties of physically defined subpopulations of the sample. We find that, among our preselected sample, gamma-ray–loud blazars detected by the LAT are significantly more variable at 15 GHz, attributable to a difference in variability between the gamma-ray–loud and gamma-ray–quiet flat spectrum radio quasars. The BL Lacertae objects in the samples do not show this division in variability amplitudes. In the first two years of our program, a  $3\sigma$ -significant difference between variability amplitudes for sources at redshift  $z \geq 1$  and for sources at  $z < 1$  was found. This difference is found no longer to be significant in the full 42-month data set, particularly after we apply an analysis method to account for the effect of cosmological time dilation.

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