The B3 VLA survey at 2.8 cm wavelength

L. GREGORINI[1,2], U. KLEIN[3], K.-H. MACK[1,3], M. VIGOTTI[1], J. ZÖNNCHEN[3]
[1]Istituto di Radioastronomia del CNR, Bologna
[2]Dipartimento di Fisica, Università di Bologna, Bologna
[3]Radioastronomisches Institut der Universität Bonn

The B3VLA sample is a subset of 1050 sources selected from the B3 survey in 5 flux bins by narrowing the survey strip in declination and restricting it to high galactic latitudes so that the completeness is very carefully controlled. At present, the identifications of about 550 B3VLA sources are known, some 400 have measured redshifts. Radio continuum flux densities of B3VLA sources have been measured over a wide frequency range. The brighter sources and those with steeper low-frequency spectra form part of the 6C survey which is complete at flux densities $\geq$ 200 mJy. The 408-MHz flux densities were taken from the original B3 survey. The VLA data have been obtained at 1.465 GHz. Detailed VLA maps in A and C arrays were achieved for all sources; in addition, 300 sources that are more extended have been mapped in the D array. At higher frequencies subsamples were observed using the 100-m Effelsberg telescope at 4.7 GHz and the 300-ft Greenbank telescope at 4.8 GHz, respectively. We have observed the remaining sources to a large completeness. In order to further enlarge the frequency range for this sample we have embarked on a project to observe all sources at 10.6 GHz with the Effelsberg telescope.
The size of the sample, its carefully controlled completeness, the large number of sources with known redshifts (even though the highest measured redshift is only 3.1) allows us to address several questions e.g. related to cosmological problems.

- The number of objects in the sample permits to derive the spectral shapes of reasonably large numbers of subsamples of different source categories (e.g. compact steep spectrum sources, CSS, gigahertz peaked spectrum sources, GPS)

- The spectral-index to flux-density relations for source samples selected at low frequencies can be studied. Applying the B3 VLA sample observed at a frequency range between 151 MHz and 10.6 GHz will be a powerful instrument to reject various models proposed in this field.

- A spectral ageing analysis of the B3 VLA sample is – to our knowledge – the first study of a large and statistically complete sample which is performed over a wide frequency range.

- Along with the upcoming polarization data from WENSS and NVSS the high-frequency polarization information obtained with the Effelsberg telescope will allow us to determine rotation measures and depolarization for a huge number of sources. These are valuable data for both extragalactic and galactic research.