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Author: Ms. Carmen Choza
University of California, Berkeley, United States, cgchoza@gmail.com

THE BREAKTHROUGH LISTEN SEARCH FOR INTELLIGENT LIFE: A TECHNOSIGNATURE
SEARCH OF 97 GALACTIC TARGETS

Abstract

The Breakthrough Listen search for intelligent life is, to date, the most thorough technosignature search of nearby celestial objects. We present a radio technosignature search of 97 nearby galactic centers, observed by Breakthrough Listen at the Robert C. Byrd Green Bank Telescope. Though the great distances to even the nearest galaxies necessitate a transmitting civilization to be capable of harnessing immense power, galaxies provide an opportunity to maximize the number of observed stars and probe the bright end of the technological luminosity function. We performed a narrowband Doppler drift search with a minimum signal to noise threshold of 33, across a drift rate range of $\pm 4 \text{ Hz s}^{-1}$, with a resolution of 3 Hz. We eliminated false positives by using a cadence pattern of six observations, discarding signals with Doppler drift rates of 0, and apply clustering and statistical methods for the classification of radio frequency interference. We present results in four frequency bands covering 1 – 11 GHz, and place constraints on the presence of transmitters with equivalent isotropic radiated power on the order of 10^{23} W , corresponding to the power consumption of Kardashev II civilizations.