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# THE BREAKTHROUGH LISTEN SEARCH FOR INTELLIGENT LIFE: THE FIRST SETI RESULTS AND OTHER FUTURE PROJECTS.

**Abstract**

The Breakthrough Listen (BL) Initiative is the largest campaign in human history on the search for extraterrestrial intelligence. The work presented here is the first BL search for engineered signals. This comprises a sample of 692 nearby stars within 50 pc. We used the Green Bank Telescope (GBT) to conduct observations over 1.1-1.9 GHz (L-band). Our observing strategy allows us to reject most of the detected signals as terrestrial interference. During the analysis, eleven stars show events that passed our thresholding algorithm, but detailed analysis of their properties indicates they are consistent with known examples of anthropogenic radio frequency interference. This small number of false positives and their understood properties give confidence on the techniques used for this search. We conclude that, at the time of our observations none of the observed systems host high-duty-cycle radio transmitters emitting at the observed frequencies with an EIRP of $10^13$ W, readily achievable by our own civilization.We can place limits on the presence of engineered signals from putative extraterrestrial civilizations inhabiting the environs of the target stars. Our results suggest that fewer than $\sim 0.2\%$ of the stellar systems within 50 pc possess the type of transmitters searched in this survey. This work provides the most stringent limit on the number of low power radio transmitters around nearby stars to date. We explored several metics to compare our results to previous SETI efforts. We developed a new figure-of-merit that can encompass a wider set of parameters and can be used on future SETI experiments for a meaningful comparison.We note that the current BL state-of-the-art digital backend installed at the Green Bank Observatory is the fastest ever used for a SETI experiment by a factor of a few. Here we will describe the potential use of the BL backend by other groups on complementary science, as well as a mention the ongoing and potential collaborations focused in particular in the study of astrophysically powered radio emission from stars targeted by our program.