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SETI 1: SETI Science and Technology (1)

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BREAKTHROUGH LISTEN: GREEN BANK TELESCOPE OBSERVATIONS, ANALYSIS, AND PUBLIC DATA

Abstract

Breakthrough Listen (BL) is carrying out the largest SETI search to date, using dedicated digital backends deployed to telescopes worldwide. These powerful compute clusters consist of commercial-off-the-shelf hardware, configured as spectrometers capable of digitizing billions of frequency channels at once, across gigahertz of the radio band.

BL's primary radio facility in the Northern Hemisphere is the Green Bank Telescope (GBT), the largest steerable radio dish in the world. BL observes as primary user for around 1/5 of the available time on the telescope. The GBT is observing a selection of targets that includes nearby stars, the centers of nearby galaxies, exoplanet candidates, and a survey of our own Galactic Plane, in addition to other objects including some Solar System targets.

As of March 2021, BL has generated over almost 14 PB of archival data products. 2 PB are currently available in a publicly accessible archive (including 1 PB of data from GBT), which continues to grow as data are transferred from the telescope sites. Our open-source strategy also includes a software suite which enables data to be ingested into Python programs, and software that performs searches for narrow-band Doppler drifting signals.

I will describe the current status of BL's observing program at GBT, the analysis pipeline, highlighted public datasets, collaborations with academia and industry, and some of our latest science results.