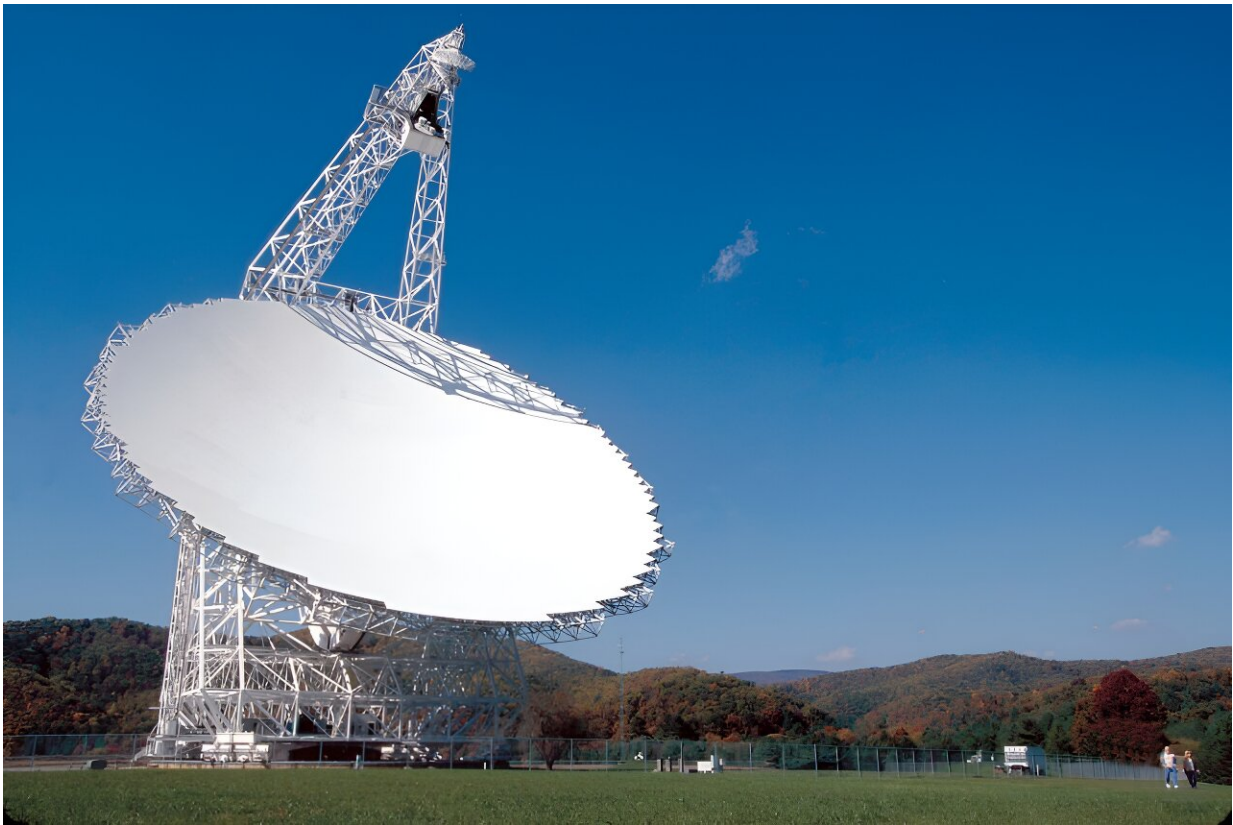


Astronomers scan 11,680 nearby stars for signals from advanced civilizations

August 15 2023, by Carolyn Collins Petersen



The Green Bank Telescope is the world's largest, fully-steerable telescope. A team from UCLA used it to search for possible extraterrestrial signals from advanced civilizations "out there." Credit: NRAO/AUI/NSF

The hunt for alien life and its radio signals from beyond our solar system

is still coming up dry. But, it's not for lack of looking for possible advanced civilizations.

A recent search led by Jean-Luc Margot of UCLA's Earth, Planetary, & Space Sciences Department scanned stars within a few hundred light-years of Earth. Margot and his team looked for radio signatures of advanced civilizations in a sampling of "TESS Objects of Interest." TESS is the Transiting Exoplanet Survey Satellite doing an all-sky survey of nearby stars and their possible planets. The paper is published on the *arXiv* preprint server.

Margot is founder of UCLA SETI's "Are We Alone in the Universe?" project. It looks for evidence of other civilizations in the universe and pulls information from radio emissions that might identify them. From 2020 to 2023, Margot's team pointed the Green Bank Telescope toward the TESS objects to capture radio emissions coming from a specific region of space. The team used the L-band receiver on the scope, which scans a region of the spectrum between 1.15 and 1.73 GHz. That's a narrowband "window" where they suggest it might be possible to detect alien signals if they exist.

It would be exciting to find a "wow!" signal from another [civilization](#). But, that didn't happen this time. The team wrote a paper detailing their work, and concluded, "Based on our observations, we found that there is a high probability (94.0%–98.7%) that fewer than ~0.014% of stars earlier than M8 within 100 pc host a transmitter that is detectable in our search." That's a rather definitive conclusion that [nearby stars](#) aren't sending cosmic "hello" greetings in our direction.

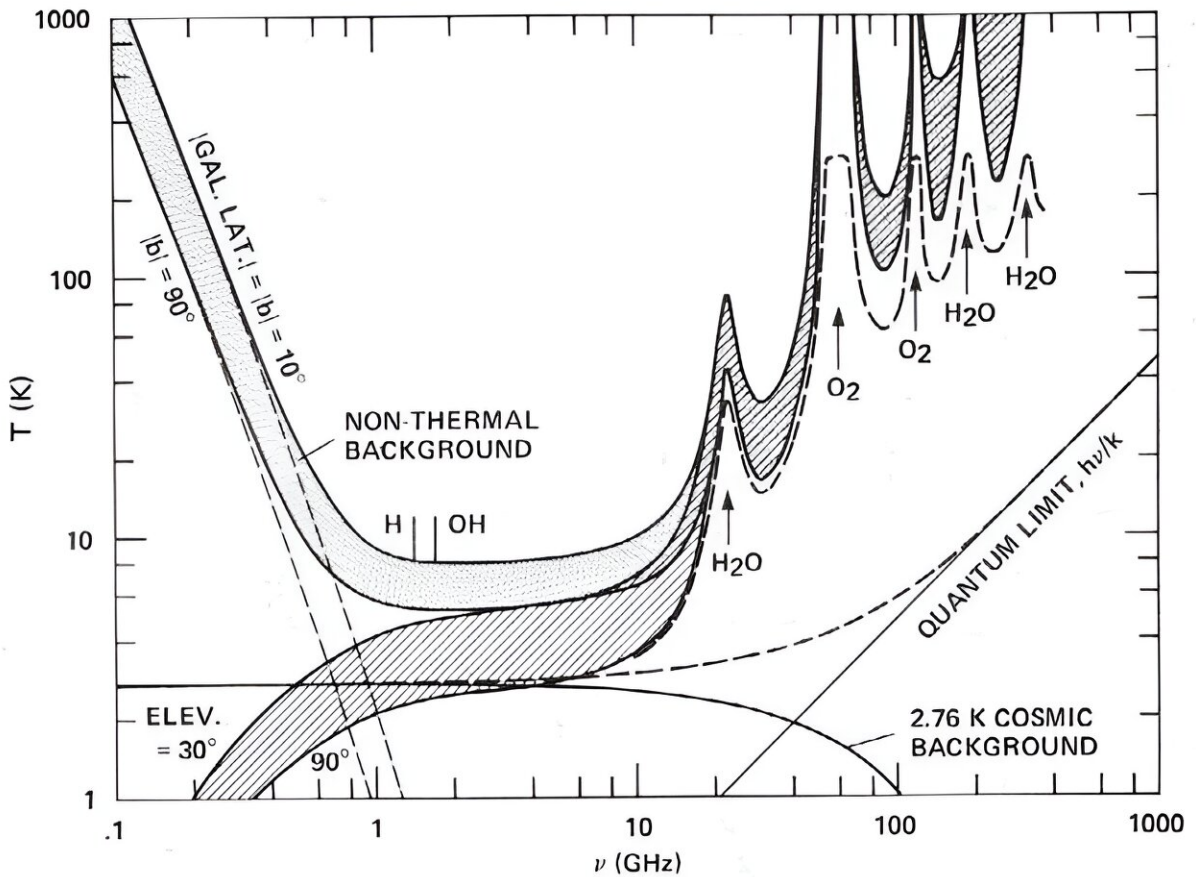
What would advanced civilizations use to communicate across space?

The hunt for extraterrestrial signatures from advanced civilizations is a relatively young science. The first searches began in the mid-20th century. Since then, SETI astronomers have figured out [search strategies](#) using available radio telescopes. But, it still faces some physical realities.

It's no surprise that communications across the gulfs of space are difficult. There's a time lag, of course. A signal we send to Proxima Centauri saying "Howdy" would take just over four years to get there at the speed of light. If anybody exists there, they'd sent a "Hi neighbor" back to us—again at the speed of light. Of course, it takes another four years or so to travel between us. That's eight years to establish a connection.

Consider also that signals have to pass through whatever "stuff" exists in space, like gas and dust. Those absorb some forms of radiation. However, [radio signals](#) get through pretty well, which makes them a good choice for an interstellar greeting. Next, you have to consider what frequencies to use. It turns out those between 1 and 10 GHz are quite useful because they avoid the galaxy's "hum" at [lower frequencies](#). At higher frequencies, our own atmosphere (and probably those of other planets) can drown out any signals.

So, astronomers assume that another technologically advanced civilization might use that range, too. Of course, there are also language differences and cultural assumptions, which would shape any messages. But, at least having a frequency range helps get the hunt going.



The "microwave window" as seen from Earth. This is the frequency range through which we might be able to detect technosignatures from distant advanced civilizations. Credit: NASA

What the team did

In their SETI search, Margot's team reasoned that they'd need to sample for emissions made by technologically savvy beings. They wrote, "The search for technosignatures provides an opportunity to obtain robust detections with unambiguous interpretations. An example of such a technosignature is a narrowband (say,

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