IS ET CALLING FROM 1 500 LIGHT YEARS AWAY?

By Henry Holden

OR, COULD it be a "hailing signal" by an alien society trying to make contact, and broad-band microwave signals that might be created by beamed propulsion.

A star somewhat similar to our Sun, KIC 8462852, is one of many distant stars being monitored by NASA's robotic Kepler Space Telescope to see if it has planets.

Star KIC 8462852, in the constellation Cygnus, almost 1 500 light years from Earth, keeps flickering (or dimming) in such an unfamiliar way that there is no known natural explanation. Common reasons for dimming — such as eclipses by orbiting planets or stellar companions – or dust disks do not match the non-repetitive nature of the flickering.

The star first made headlines about a year ago, when Tabetha Boyajian, a postdoctoral fellow at Yale University, published a study on the star in *Monthly Notices of the Royal Astronomical Society*. Boyajian's work led both scientists and space enthusiasts alike to scratch their heads and head down the axiomatic rabbit hole of the hunt for advanced extra-terrestrial life.

Boyaijian, seeking a new perspective on the puzzling observations, contacted Penn State's Jason Wright, and together they enlisted Andrew Siemion, a researcher at the SETI Research Centre at UC Berkeley. The goal: to see whether Tabby's star (as it's come to be known) might be getting blocked by some massive alien structure that's casting a shadow, resulting in the inexplicable dimming.

SETI STARTS TO LISTEN

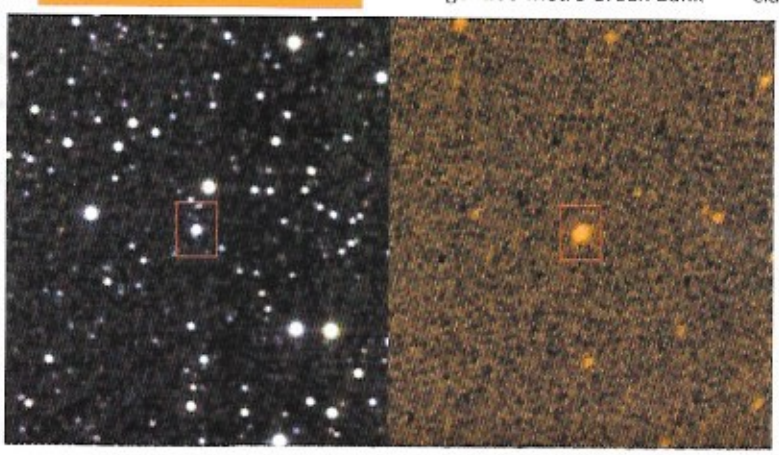
Douglas Vakoch, SETI (Search for Extraterrestrial Intelligence) Institute in Mountain View, California, director of interstellar message composition, decided they wanted to listen with their array of radio satellite telescopes.

"One of the advantages of having our own telescope is that we could shift our scheduling to start observing the target immediately" said Vakoch. "It would have been extremely frustrating to wait our turn at another observatory if this really is ET calling.

"We regularly target stars with known planets, but this one is different," he added. "Something is circling it, but we don't know what."

Above: Pictured here is an artist's illustration of a planet breaking up, drawn to depict NGC 2547-ID8, a different system that shows infrared evidence of such a collision. Recent observations of KIC 8462852 did not detect the infrared glow of a closely orbiting dust disk. (Photo: NASA/JPL-Caltech).

Below: Star KIC 8462852 in infrared and ultraviolet. (Photo: Infrared: IPAC/NASA; Ultraviolet: STScI (NASA)



Vakoch and his team tuned their Allen Telescope Array consisting of 42,6-metre antennae to two different types of radio signals: the narrow-band signals they usually look for, which would be generated as a "hailing signal."

"If the dimming around this star is due to an alien megastructure, it's possible there are spaceships servicing these behemoths," Vakoch said. "Wide-band signals microwave signals could be used as the propulsion to move these ships around."

After several weeks of silence, SETI gave up listening.

But Boyajian is glad they tried. She was "quite pleased that the community is jumping on board so quickly" She believes that "a null detection in this case does not close the book on the search."

Wright and Siemion hope to use the much bigger and stronger 100-metre Green Bank Telescope in West Virginia to listen for what they call "less-outrageously powerful transmissions" across a broader range of frequencies and signal types.

A NEW STUDY

A study by Carnegie Institution for Science's Josh Simon and Caltech's Ben Montet havr been accepted for publication in *The Astrophysical Journal* but rather than providing clear answers, this new research adds more mystery to the star.

Simon and Montet looked at Kepler's observations and noticed that beyond the shifts in brightness, the star "faded slowly and steadily" over a four-year period. The main questions rest in why the star seems to fade in and out – Do huge clusters of comets orbit around the star, for instance? Or is it a flickering sign of an extra-terrestrial civilisation?

Bradley Schaefer, an astronomer at Louisiana State University, has probed the star's behaviour over the past century by looking at old photographic plates. He found the star's brightness gradually decreased by 14-percent from 1890 and 1989, and delved into a group of the telescope's calibration images that had not been used before for measurements.

"We thought that these data could confirm or refute the star's long-term fading, and hopefully clarify what was causing the extraordinary dimming events observed in KIC 8462852," Simon said in a Carnegie Institution press release.

BIZARRE FINDINGS

What did they find? The bizarre star dimmed by nearly one percent over the course of Kepler's first three years of observations.

More shocking is that its brightness then went down by two percent in just six months, and stayed that way for the final six months of the Kepler mission.

The researchers took this data and held it up against observations of 500 similar stars pinpointed by Kepler.

A small number of these stars faded in a similar way over Kepler's initial three years. However, none of the other stars displayed either the same drastic dimming in six months, nor the total brightness change of three percent.

Montet called the comparison "pretty astounding."

"It is unprecedented for this type of star to slowly fade for years, and we don't see anything else like it in the Kepler data," he added.

"This star was already completely unique because of its sporadic dimming episodes. But now we see that it has other features that are just as strange, both slowly dimming for almost three years and then suddenly getting fainter much more rapidly," Simon said.

Montet and Simon said they don't know what is behind the strange behaviour, but they hope their results will help crack the case eventually.

"It's a big challenge to come up with a good explanation for a star doing three different things that have never been seen before," Montet said. "But these observations will provide an important clue to solving the mystery of KIC 8462852."

"This is an oddball," said one physicist. "Kepler for years has been giving us a catalogue of over 1 000 extra-solar planets and this is the first oddball out of hundreds of thousands of stars scanned. This is the first one that does not fit the usual scenario."

As far as the story behind this star, the truth is still out there.→