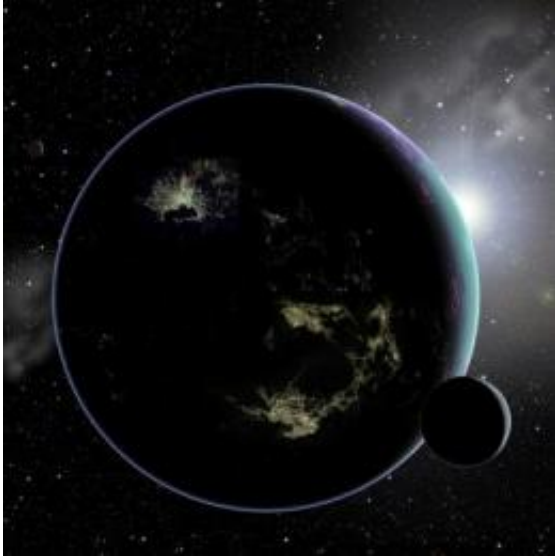


# City lights could reveal E.T. civilization

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If an alien civilization builds brightly-lit cities like those shown in this artist's conception, future generations of telescopes might allow us to detect them. This would offer a new method of searching for extraterrestrial intelligence elsewhere in our Galaxy. Credit: David A. Aguilar (CfA)

In the search for extraterrestrial intelligence, astronomers have hunted for radio signals and ultra-short laser pulses. In a new paper, Avi Loeb (Harvard-Smithsonian Center for Astrophysics) and Edwin Turner (Princeton University) suggest a new technique for finding aliens: look for their city lights.

"Looking for alien cities would be a long shot, but wouldn't require extra resources. And if we succeed, it would change our perception of our

place in the universe," said Loeb.

As with other SETI methods, they rely on the assumption that aliens would use Earth-like technologies. This is reasonable because any intelligent life that evolved in the light from its nearest star is likely to have artificial illumination that switches on during the hours of darkness.

How easy would it be to spot a city on a [distant planet](#)? Clearly, this light will have to be distinguished from the glare from the [parent star](#). Loeb and Turner suggest looking at the change in light from an [exoplanet](#) as it moves around its star.

As the planet orbits, it goes through phases similar to those of the Moon. When it's in a dark phase, more artificial light from the night side would be visible from Earth than reflected light from the day side. So the total flux from a planet with city lighting will vary in a way that is measurably different from a planet that has no artificial lights.

Spotting this tiny signal would require [future generations](#) of telescopes. However, the technique could be tested closer to home, using objects at the edge of our solar system.

Loeb and Turner calculate that today's best telescopes ought to be able to see the light generated by a Tokyo-sized metropolis at the distance of the [Kuiper Belt](#) - the region occupied by Pluto, Eris, and thousands of smaller icy bodies. So if there are any cities out there, we ought to be able to see them now. By looking, astronomers can hone the technique and be ready to apply it when the first Earth-sized worlds are found around distant stars in our galaxy.

"It's very unlikely that there are alien cities on the edge of our solar system, but the principle of science is to find a method to check," Turner said. "Before Galileo, it was conventional wisdom that heavier objects

fall faster than light objects, but he tested the belief and found they actually fall at the same rate."

As our technology has moved from radio and TV broadcasts to cable and fiber optics, we have become less detectable to aliens. If the same is true of extraterrestrial civilizations, then artificial lights might be the best way to spot them from afar.

Provided by Harvard-Smithsonian Center for Astrophysics

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