

New Horizons is so far away, it can measure the true darkness of the universe

August 17 2023, by Brian Koberlein



Artist view of the New Horizons spacecraft against a sea of stars. Credit: Serge Brunier/Marc Postman/Dan Durda

Just how dark is the night sky?

If you step outside during a moonless night and look up, it probably doesn't look that dark at all. Streetlights or nearby porch lights fill the air

with a background glow, particularly if they happen to be bluish-white LEDs. Light pollution in your neighborhood is likely so bad that you can only see a few bright stars. Even in somewhat rural areas, our skies are so bright that the Milky Way isn't really visible. In North America and Europe, only about a quarter of children have seen the Milky Way.

To get away from all the light pollution you need to travel to a pretty remote corner of the world. One of the most remote is the Andean desert in Chile. If you have a chance to visit one of the major observatories there you can catch a glimpse of the darkest skies in the world. On a moonless night with the Milky Way overhead you can see a vast sea of stars and shadow constellations along the multicolored glow of the galactic center. There the skies are so dark that the Milky Way casts a faint shadow you can see when your eyes are fully dark adapted.

But even that is not a truly dark sky. Our [atmosphere](#) emits a faint glow even in the darkest night. It's caused by ultraviolet sunlight and [cosmic rays](#) which ionize Earth's upper atmosphere. This airglow isn't noticeable when we look directly overhead, but it's there, and it limits the view of Earth-based telescopes. Even our best observatories have to deal with [light pollution](#).

So we launch telescopes into space. Beyond our atmosphere, the Hubble and Webb telescopes surely get a pure view of the sky. Wondrous as their images are, they don't capture the truly dark sky. Sunglow is still an issue. Our solar system is filled with diffuse dust, and every particle scatters light back toward our world. On Earth, we can see this dust-scattered glow as the zodiacal light. It's faint to our eyes, but visible even in space. The night of interplanetary space is dark, but still not dark enough.

To get a real view of the dark sky, we would need to travel beyond the dust, to the furthest edge of our solar system. Far beyond the orbit of

Pluto. Voyagers I and II have traveled that far, as have Pioneers 10 and 11. We've long lost contact with the Pioneers, and while we still communicate with the Voyagers, they can't transmit any useful images to us. But there is a distant spacecraft that can.

New Horizons flew past Pluto in 2015, and then past the Kuiper Belt Object Arrokoth. It is now twice as distant from the sun, and its cameras can still gather data. Recently the New Horizons team tried to capture the fragile darkness of the universe. They aimed New Horizons at a patch of sky far away from the Milky Way, away from the sun, and away from [bright stars](#). Then they measure how much light the camera captured.

When they compared that amount to the amount captured by Hubble's view of dark sky, they found it was darker by an expected amount, but there is still some faint glow astronomers can't explain. If you calculate the background light you'd expect from distant galaxies all the way back to the [big bang](#), New Horizons measured about twice as much. So the team plan to observe 15 other dark locations over the next month, hoping to see the naked dark of the cosmos, or to verify this mysterious background glow.

And perhaps through the darkest skies, we will see the light.

Provided by Universe Today

Citation: New Horizons is so far away, it can measure the true darkness of the universe (2023, August 17) retrieved 28 April 2024 from <https://phys.org/news/2023-08-horizons-true-darkness-universe.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.