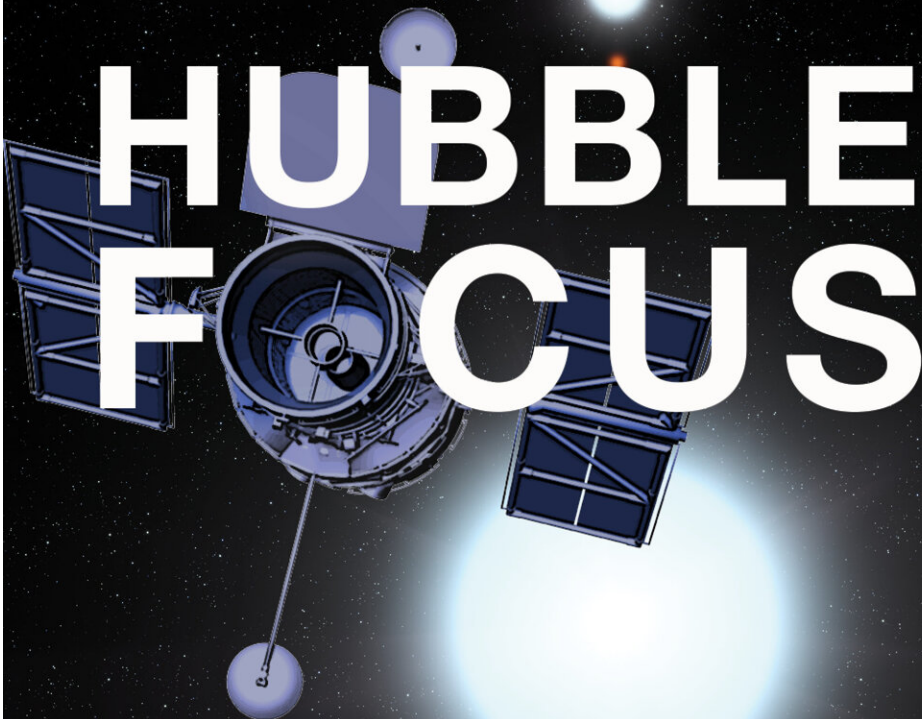


# **NASA's new Hubble E-book takes readers on a journey to curious worlds**

July 5 2022, by Ashley Balzer

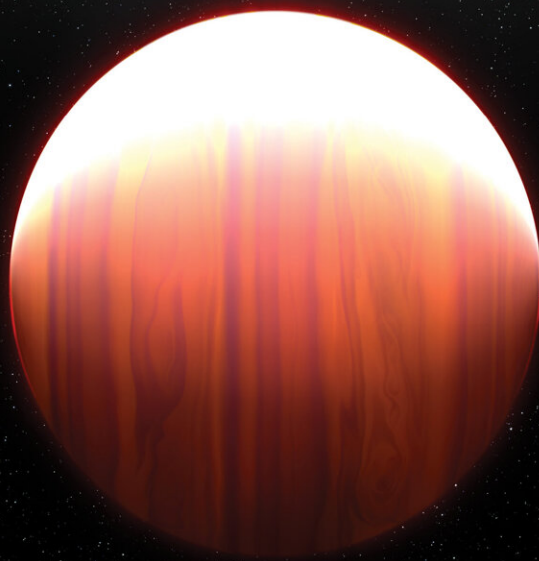
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National Aeronautics and Space Administration



# HUBBLE FOCUS

## Strange New Worlds



[www.nasa.gov](http://www.nasa.gov)

This artist's concept shows the seven Earth-sized planets in the TRAPPIST-1 system. Hubble studied several of the planets' atmospheres and found that they could be conducive to life as we know it, though follow-up observations are needed to confirm this finding. Credit: NASA/JPL-Caltech This e-book is part of a series called Hubble Focus, which presents some of Hubble's recent cosmic discoveries. Its cover, shown here, features an illustration of the scorching hot planet Kepler-13Ab that orbits extremely close to its host star, Kepler-13A, which is part of a multiple star system. The star's companions, Kepler-13B and the small orange-red dwarf Kepler-13C, are in the background. Credit: NASA's Goddard Space Flight Center

NASA's Hubble Space Telescope team has released a new edition in the Hubble Focus e-book series, called "Hubble Focus: Strange New Worlds." This e-book highlights the mission's recent discoveries about worlds outside our solar system, known as exoplanets.

"The Hubble Space Telescope is once again opening our eyes to an incredible universe, this time to the nature of alien worlds," said Jennifer Wiseman, NASA's Hubble senior project scientist. "These are impressive achievements when we consider that when Hubble was designed and launched, no exoplanets had yet been discovered."

## **Weird Worlds and Other Earths**

For thousands of years, people believed Earth was fixed at the center of the universe and that every other celestial object revolved around our planet. But over time, it became clear that Earth did not occupy such a special position. People began to see that perhaps Earth was not as unique as they thought. Some even wondered if there might be [planets](#) circling other stars.

To date, astronomers have found more than 5,000 exoplanets. While astronomers initially expected to find systems similar to ours, most of the first exoplanets they discovered were wild and exotic compared to our solar system. Hubble's [exoplanet](#) studies continue to help broaden our view of planetary systems by revealing even more oddballs, often by investigating the chemistry of their atmospheres via spectroscopy—the study of the information coded in light.

Hubble's [spectroscopic observations](#) have unveiled withering worlds that dwindle as they lose their atmospheres to space, and planets in bizarre orbits. But the observatory has also revealed worlds that are more similar to our own. Hubble has studied exoplanets' atmospheres and found several that contain [water vapor](#)—an essential ingredient for life as we know it. Some of these worlds even orbit within their star's [habitable zone](#), which is the range of orbital distances where temperatures are mild enough that liquid water could pool on planetary surfaces. "Hubble has provided us with a wealth of information on the variety that exists among exoplanets, probing the composition of their atmospheres and discovering exotic weather seen nowhere on Earth or even elsewhere in our solar system," said Ken Carpenter, Hubble's operations project scientist based at NASA Goddard Space Flight Center. "It has also carried out an extremely critical exploration of relationship between these exoplanets and their host stars and how it drives conditions on the planetary surfaces that influence their habitability. Hubble has shown us that even stars unlike our sun may harbor habitable worlds and thus broadened our search for life elsewhere in the galaxy."

## **Alien Weather and Stellar Relationships**

Earth exhibits a wide range of weather, from rolling thunderstorms to sunny skies to blizzards. Thanks to Hubble, astronomers have learned about the weather some exoplanets experience, including molten iron rain, amber skies, and even sunscreen-like snow flurries. Future

observations could reveal more information about what drives exoplanets' weather, including their relationships with their host stars.

If our own host star, the sun, were just a little hotter or colder, or if it were much older or younger, Earth might not be habitable. Hubble has helped astronomers explore other planet-star relationships, offering clues to how they may evolve and informing our search for habitable worlds. The observatory has even revealed a world with two suns and studied different types of stars to explore which are most conducive to life.

While sun-like stars may be the most obvious targets to search for [habitable planets](#), Hubble revealed that orange dwarfs—smaller and cooler than our yellow-white sun, but larger and hotter than red dwarfs—could offer better chances. These stars are not too hot, too cool, or too violent to host life-friendly planets over vast stretches of cosmic time. Hubble's future observations will continue to help us focus our search for habitable worlds, bringing us ever closer to the possibility of finding life on other planets.

## **Disk Dwellers**

New stars form in the Milky Way from swirling clouds of gas and dust that are peppered throughout our galaxy. Vestiges of those clouds remain, surrounding each star in a disk that grows ever more diffuse as debris clumps together to form objects like planets. Hubble's exoplanet studies have largely focused on the planets themselves, but occasionally surprises pop up in the disks in which these planets are embedded.

Hubble has seen an eerie shadow sweep across a star's surrounding disk, studied comets a planet's gravity is hurling into its star, and watched a growing planet gobble up material. The observatory has even offered clues about the mystery of why so few planets between the sizes of Earth and Neptune exist. Hubble will continue to reveal new information about

the worlds that grace our galaxy for years to come, providing hints about our own solar system's formation and evolution along the way.

As the fourth edition of the series, this e-book builds on the wealth of information shared in previous renditions, which focused on the [solar system](#), [stars](#), and galaxies. Upcoming editions will zoom in on other cosmic topics, such as [dark matter](#) and dark energy—two invisible cosmic mysteries that make up the majority of our universe.

**More information:** ePub format (120 MB):

[www.nasa.gov/sites/default/files/lanets\\_june2022.epub](http://www.nasa.gov/sites/default/files/lanets_june2022.epub)

PDF format (5 MB): [www.nasa.gov/sites/default/files/planets\\_june2022.pdf](http://www.nasa.gov/sites/default/files/planets_june2022.pdf)

Provided by NASA's Goddard Space Flight Center

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