CENTER FOR SCIENCE & CULTURE | DESIGNED FOR DISCOVERY

Is Earth a speck or a Privileged Planet?

Guillermo Gonzalez
The Discovery Institute

Faith and Science
Krakow, Poland
June 1-3, 2023

Materialism

"The Cosmos is all that is, or ever was, or ever will be."

- Carl Sagan

Copernican Principle

"… Our planet is a lonely speck in the great enveloping cosmic dark. In our obscurity, in all this vastness, there is no hint that help will come from elsewhere to save us from ourselves."

- Carl Sagan, *Pale Blue Dot*

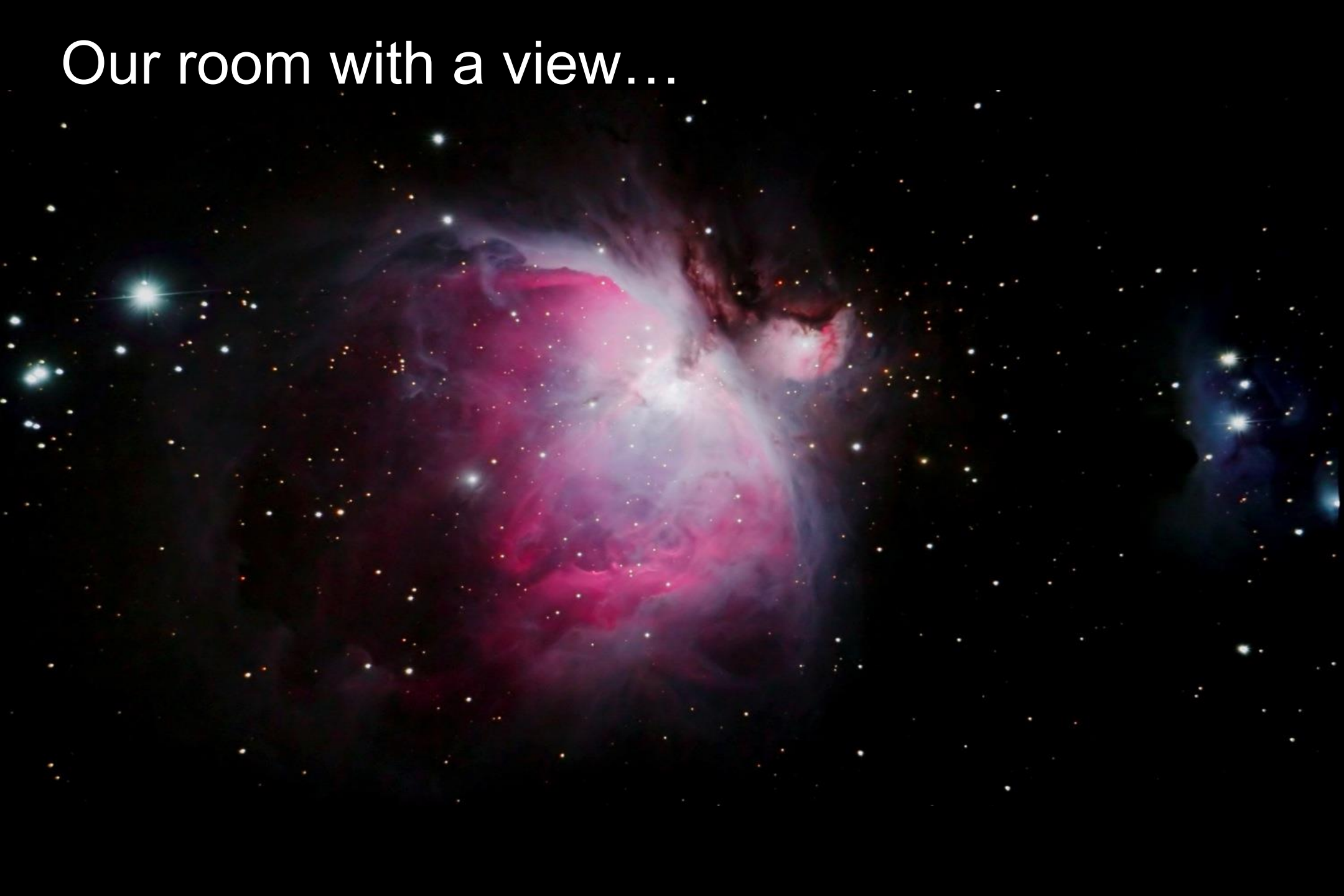
Are we *really* an insignificant speck in the universe?


CENTER FOR SCIENCE & CULTURE
DESIGNED FOR DISCOVERY
The PRIVILEGED PLANET

A room without a view…

A room with a view…

Our room with a view…



“The combined circumstance that we live on Earth and are able to see stars—that the conditions necessary for life do not exclude those necessary for vision, and vice versa—is a remarkably improbable one. This is because the medium in which we live is, on the one hand, just thick enough to enable us to breathe and to prevent us from being burned up by cosmic rays, while, on the other hand, it is not so opaque as to absorb entirely the light of the stars and block any view of the universe. What a fragile balance between the indispensable and the sublime.”

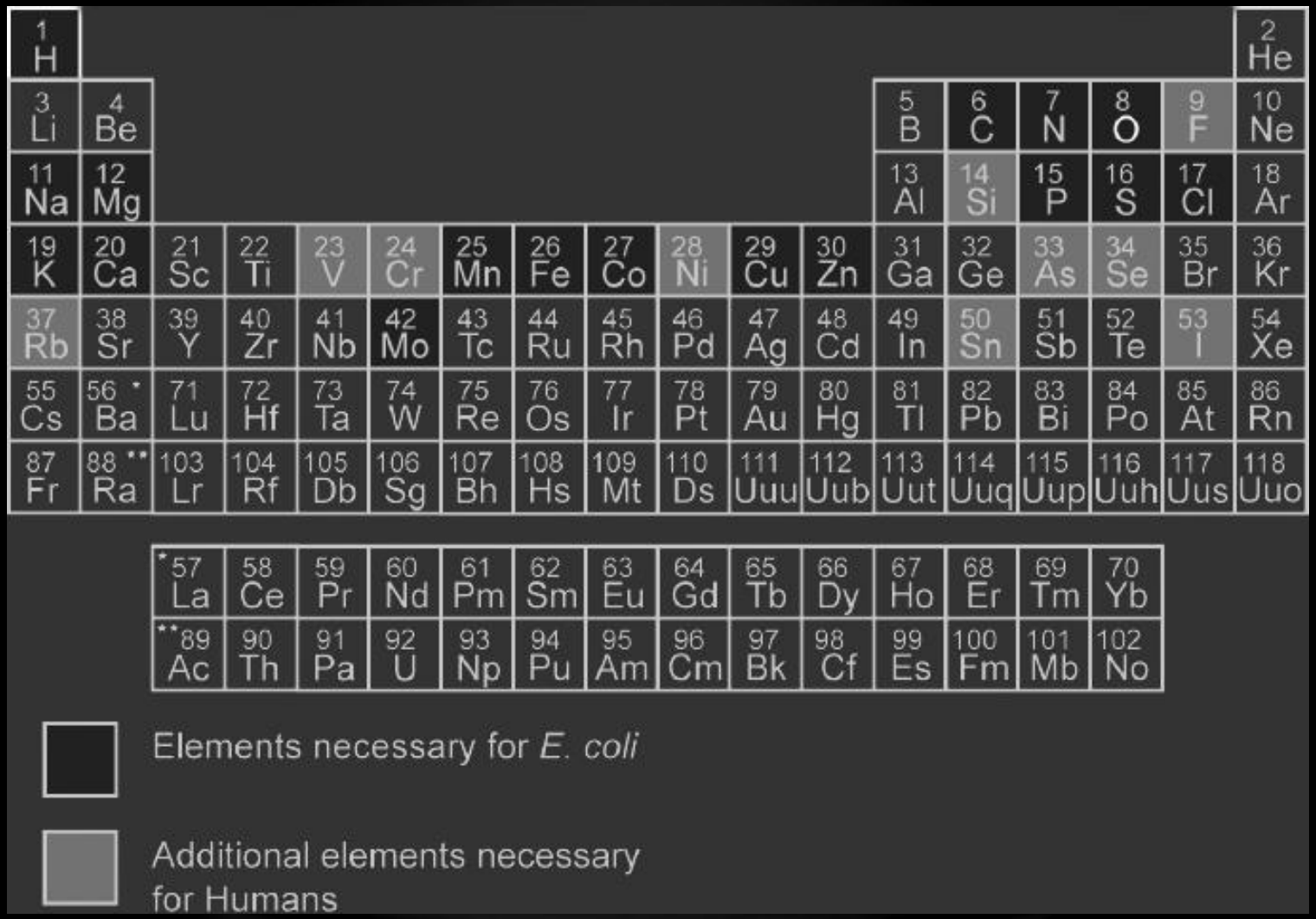
Hans Blumenberg

The Idea of Habitability

The Chemistry: Carbon & Water

- No other atom comes close to carbon in its ability to form large metastable molecules and to bond with so many other elements.
- Water is liquid over just that range of temperatures at which carbon chemistry is most active.

The Periodic Table for Life



A Habitable Planet

- A terrestrial planet that supports complex carbon- and water-based life,
- Planet in “Circumstellar Habitable Zone”,
- Planetary system in “Galactic Habitable Zone”,
- During the “Cosmic Habitable Age”.

Some things you need for a habitable planet

- Right terrestrial planet
- Stabilizing moon
- Plate tectonics
- Right atmosphere
- Right planetary neighbors
- Right single star
- Right galaxy
- Galactic location
- Right cosmic time
- Universe fine-tuned for life

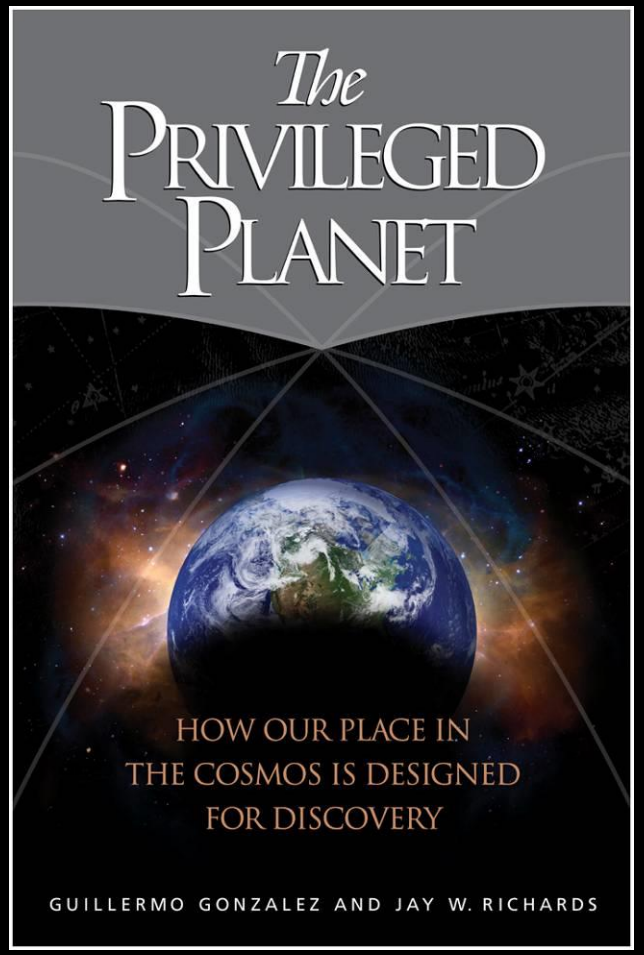
The Dilemma

- With such a large universe, how do we tell if a habitable planet like Earth is the result of chance or design?

The Dilemma

- 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 x 0.1 = 10^{-13}
- There are about 10^{11} stars in the Milky Way.
- So, there's a 1 percent chance of having just one habitable planet in the Milky Way.
- But, there are about 10^{11} galaxies in the observable universe.
- So, chance has a lot of room to operate.

The Basic Argument



Habitability Correlates
with
Measurability

The same narrow circumstances that allow us to exist also provide us with the best *overall* setting for making scientific discoveries.

The very conditions that make Earth hospitable to intelligent life also make it well suited to viewing and analyzing the universe as a whole.

Examples of the "Correlation"

- Perfect solar eclipses
- Layering processes
- Plate tectonics
- Transparency of atmosphere / Rainbows
- Planetary neighbors
- Stars
- Galactic location
- Cosmic time
- Fine-tuned cosmos

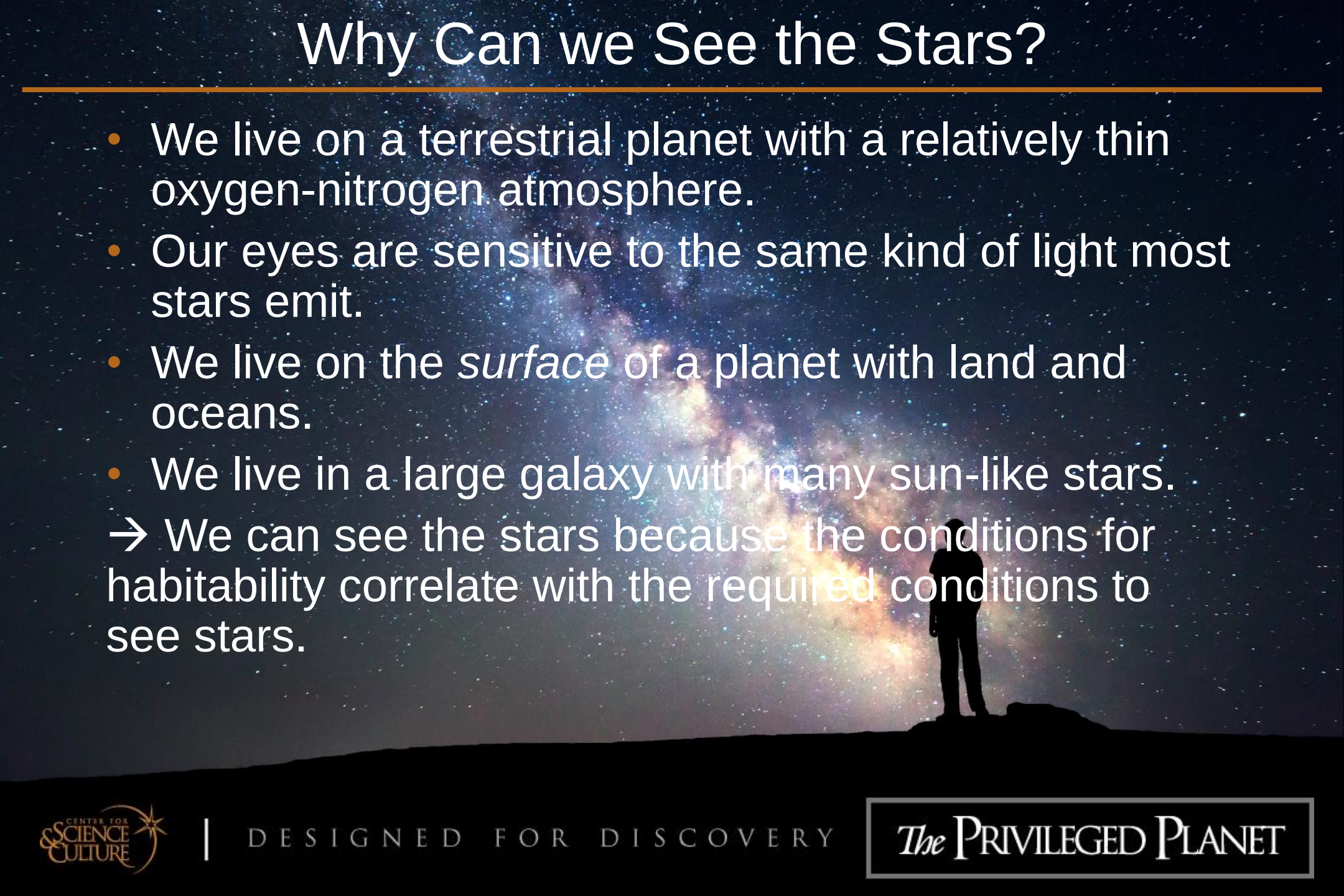
Examples of the "Correlation"

- Perfect solar eclipses
- Layering processes
- Plate tectonics
- Transparency of atmosphere / Rainbows
- Planetary neighbors
- Stars
- Galactic location
- Cosmic time
- Fine-tuned cosmos

Why Can we See the Stars?

- We live on a terrestrial planet with a relatively thin oxygen-nitrogen atmosphere.
- Our eyes are sensitive to the same kind of light most stars emit.
- We live on the *surface* of a planet with land and oceans.
- We live in a large galaxy with many sun-like stars.

→ We can see the stars because the conditions for habitability correlate with the required conditions to see stars.

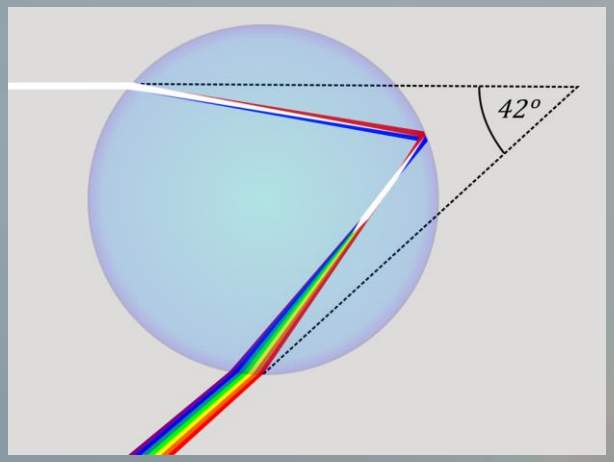


The Privilege of Rainbows

We can see rainbows!

→A clue to the most important tool of the astronomer to unlock the secrets of the universe – the spectroscope.

→ Reveals the nature of stars and galaxies.



What do you need to form a rainbow?

- Directional sunlight
- Suspended liquid droplets

→ Need a partly cloudy atmosphere, water cycle.

Where are rainbows *not* visible?

- Moon, Mercury – no atmosphere
- Surfaces of Venus, Titan – too much atmosphere
- Mars – too dry

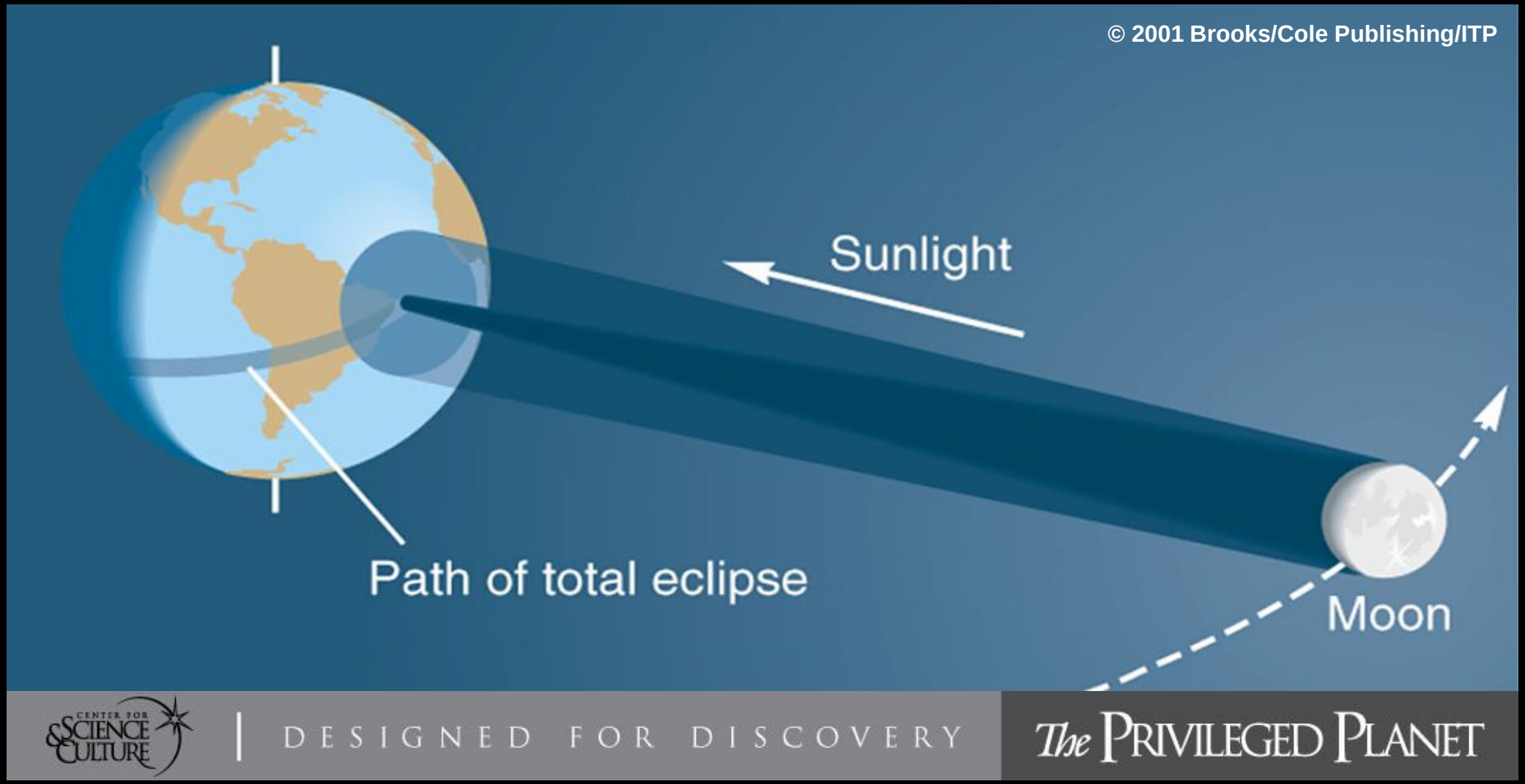
Total Solar Eclipses

The start of an enquiry…

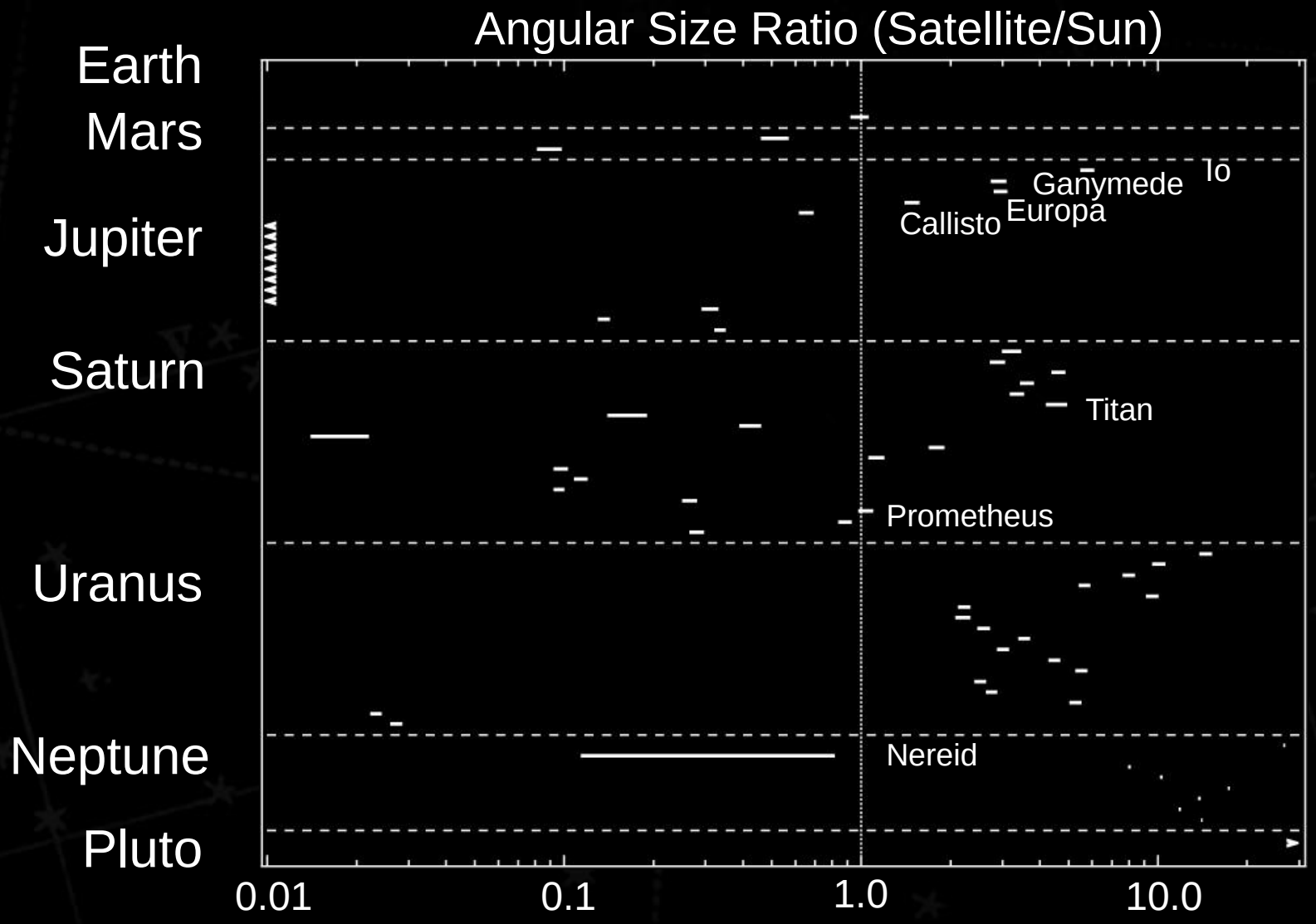
A Total Eclipse

- A luminous body
- An eclipsing body
- An observer platform
- The right distances apart
- All in a straight line in space

The apparent size of the Moon just barely covers the Sun as seen from Earth, giving us *perfect* eclipses.



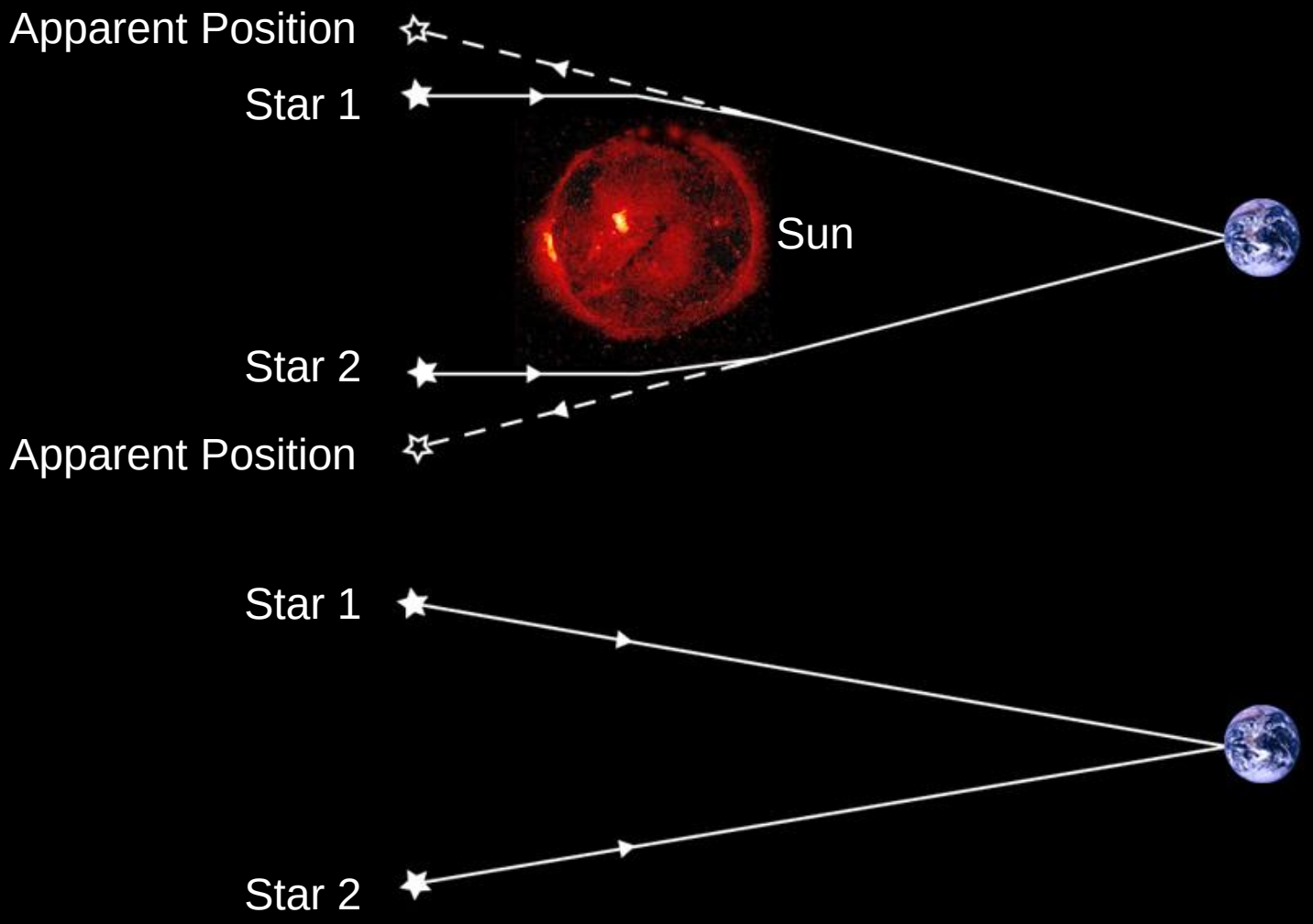
Solar Eclipses in the Solar System



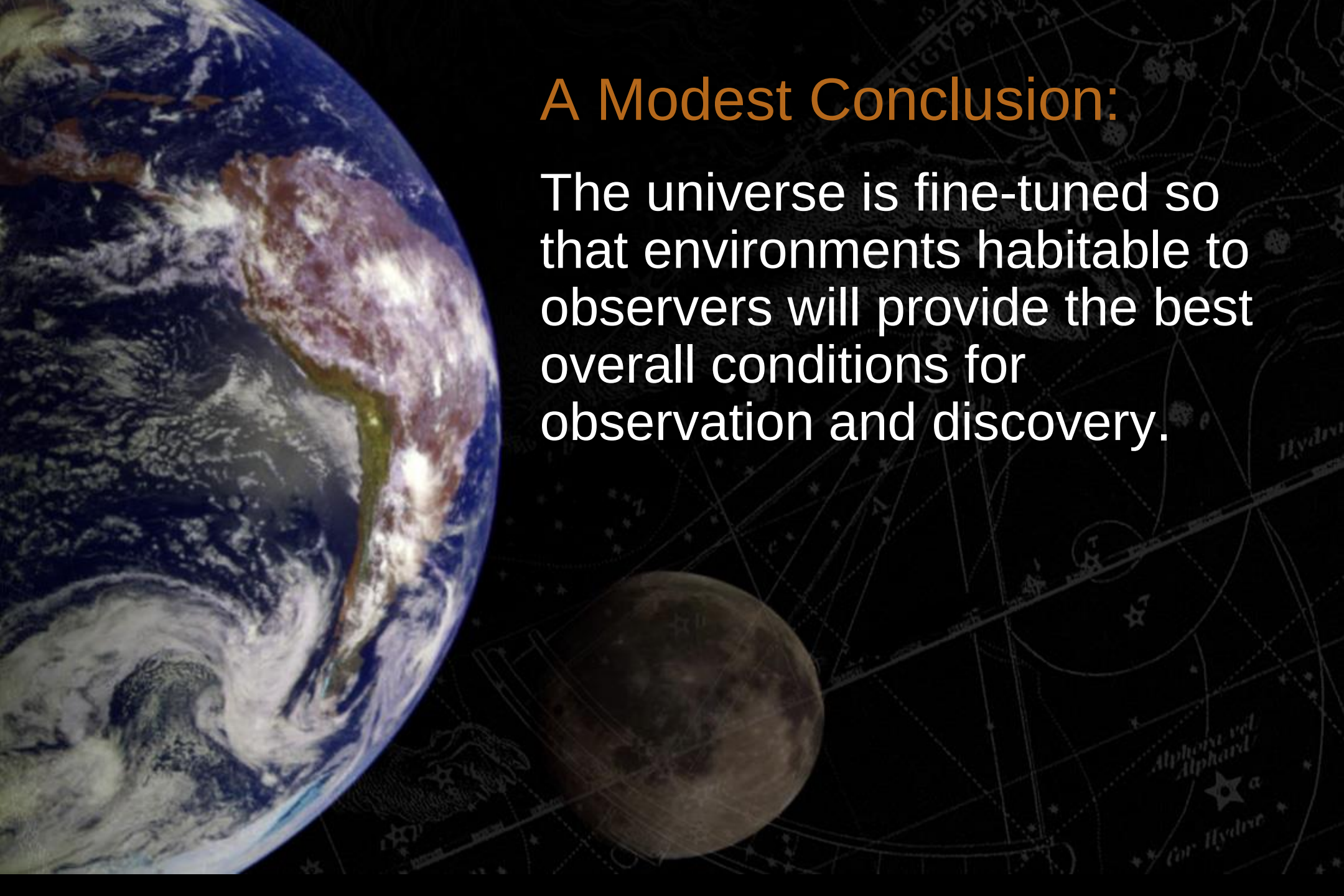
Perfect eclipses of the Sun are important for scientific discovery.

- Test of General Relativity
- Makes the corona and chromosphere visible
- Helps to measure slowdown of Earth's rotation.

Test of General Relativity




SO
WHAT?



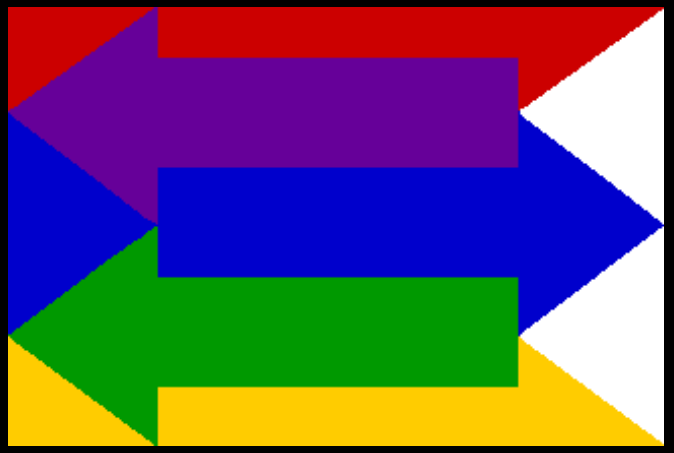
A Modest Conclusion:

The universe is fine-tuned so that environments habitable to observers will provide the best overall conditions for observation and discovery.

Complexity = Improbability

- The conditions that allow for habitability are improbable.
- The conditions that allow for discovery are improbable.

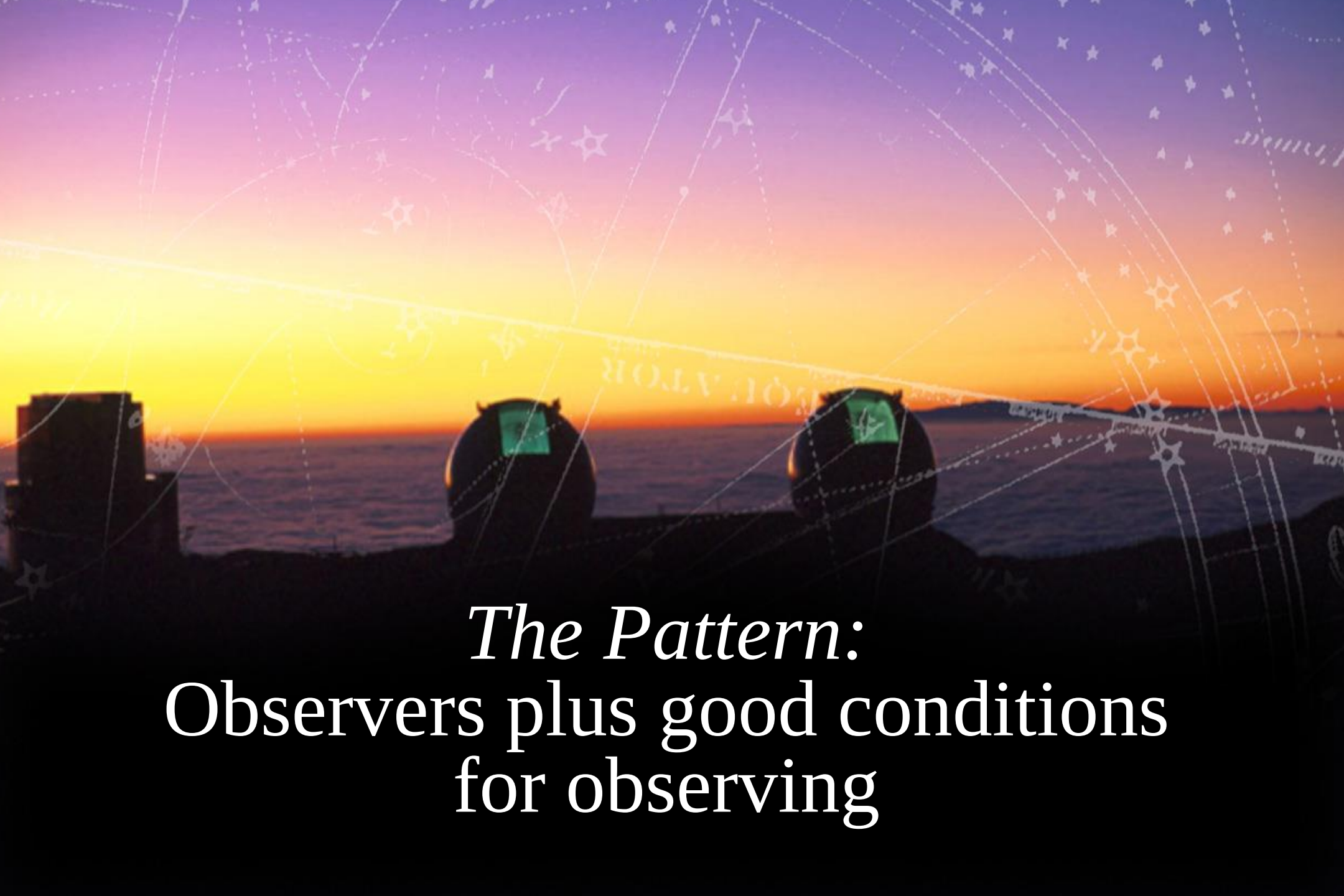
Specification = a meaningful pattern



The correlation of habitability and measurability forms a meaningful pattern.

Confirmation of Design

The correlation is more likely on the hypothesis that the universe is designed for discovery than on the accident/chance hypothesis.



The Pattern:
Observers plus good conditions for observing

The Universe is designed for *discovery*.

What does design tell us about God?

Design *confirms* theism: The correlation is more likely given theism than given naturalism.

What does design tell us about God?

Romans 1:20

“For his invisible attributes, namely, his eternal power and divine nature, have been clearly perceived, ever since the creation of the world, in the things that have been made. So they are without excuse.”

What does design tell us about God?

Aristotle (quoted by Cicero in *On the Nature of the Gods*):

"Suppose there were men who had lived always underground, in good and well-lighted dwellings, adorned with statues and pictures, and furnished with everything in which those who are thought happy abound. Suppose, however, that they had never gone above ground, but had learned by report and hearsay that there is a divine authority and power. Suppose that then, at some time, the jaws of the earth opened, and they were able to escape and make their way from those hidden dwellings into these regions which we inhabit. When they suddenly saw earth and seas and sky, when they learned the grandeur of clouds and the power of winds, when they saw the sun and learned his grandeur and beauty and the power shown in his filling the sky with light and making day; when, again, night darkened the lands and they saw the whole sky picked out and adorned with stars, and the varying lights of the moon as it waxes and wanes, and the risings and settings of all these bodies, and their courses settled and immutable to all eternity; when they saw those things, most certainly they would have judged both that there are gods and that these great works are the works of gods."

What does design tell us about God?

- We don’t need advanced degrees in the sciences to discern evidences for design in nature.
- We can see:
  - the stars, planets, and Milky Way,
  - rainbows,
  - total solar eclipses.
- These are beautiful and wonderous phenomena, pointing beyond themselves to their source.

End Of Presentation