

Scorching Lava Planet (TOI-561 b) with a "Giant Sunscreen"

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Why in News?

Recently, astronomers utilizing observations from the James Webb Space Telescope (JWST) revealed that TOI-561 b—a scorching, ultra-short-period lava planet maintains a thick, highly reflective atmosphere.

- Despite extreme stellar radiation, the planet reflects approximately **75% of incoming starlight** and an exotic silicate-mineral clouds acting as a "giant sunscreen."
- **Distance** - Located roughly 280 light-years from Earth.

Key Highlights

- **The "Giant Sunscreen" Effect**
 - Using JWST's Near-Infrared Spectrograph (NIRSpec) to map the planet's orbital phase curves, scientists discovered that TOI-561 b reflects nearly three-quarters of the starlight hitting it.
 - This immense reflectivity is driven by dense layers of **silicate-mineral clouds** suspended high above the surface, shielding the molten world from even harsher thermal loading.
- **Sustaining an "Impossible" Atmosphere**
 - Under standard astrophysical models, intensely irradiated rocky worlds orbiting close to their host stars lose their volatile gas envelopes early in their history.
 - **The Replenishment Hypothesis-** Scientists hypothesize that TOI-561 b's global **ocean of molten lava** acts as a planet-wide volcanic engine, continually venting gases (such as carbon dioxide or sulfur dioxide analogs) to replenish the upper atmosphere as fast as stellar winds erode it.

Strategic Significance

- Planetary scientists are intensely studying ultra-hot lava worlds because Earth itself likely passed through a molten magma-ocean phase during its earliest history.
- Understanding how atmospheres behave and survive under extreme stellar bombardment provides vital clues to terrestrial planet evolution across the galaxy.

TOI-561 b: THE SHINY LAVA PLANET



DISTANCE
~280 light-years
from Earth



TARGET
Ultra-short-period
rocky exoplanet



DISCOVERY
JWST phase-curve analysis
reveals ~75% starlight reflection



SILICATE SUNSCREEN

- Exotic mineral clouds reflect ~75% of incoming starlight



ATMOSPHERIC SURVIVAL

- Defies existing models predicting early atmospheric stripping in such hot planets



MAGMA OCEAN VOLCANISM

- Global molten rock ocean
- Constant volcanic activity outgassing materials



GLOBAL HEAT REDISTRIBUTION

- Powerful winds move heat from dayside to nightside effectively



Reference

[Science Daily | Scorching lava planet with a “giant sunscreen”](#)

