

'Sunscreen' layer on distant exoplanet discovered by Indian-origin researcher

12/06/2015 15:58 by admin

Washington: In what could reveal the composition of a planet and how it formed, a team including an Indian-origin researcher has detected a stratosphere, one of the primary layers of Earth's atmosphere, on a massive and blazing-hot exoplanet.

This atmospheric layer includes molecules that absorb ultraviolet and visible light, acting as a kind of "sunscreen" for the planet it surrounds. Until now, scientists were uncertain whether these molecules would be found in the atmosphere of large, extremely hot planets in other star systems.

"Understanding the links between stratospheres and chemical compositions is critical to studying atmospheric processes in exoplanets," said study co-author Nikku Madhusudhan from the University of Cambridge in Britain.

"Some of these planets are so hot in their upper atmospheres, they are essentially boiling off into space," added Avi Mandell, planetary scientist at NASA's Goddard Space Flight Centre in Greenbelt, Maryland.

At these temperatures, scientists do not necessarily expect to find an atmosphere that has molecules that can lead to these multi-layered structures.

In Earth's atmosphere, the stratosphere sits above the troposphere - the turbulent, active-weather region that reaches from the ground to the altitude where nearly all clouds top out.

In the troposphere, the temperature is warmer at the bottom - ground level - and cools down at higher altitudes. The stratosphere is just the opposite. In this layer, the temperature increases with altitude, a phenomenon called temperature inversion.

Using NASA's Hubble Space Telescope, the researchers identified a temperature inversion in the atmosphere of the exoplanet WASP-33b which has about four-and-a-half times the mass of Jupiter.

They believe titanium oxide has caused this inversion in WASP-33b's atmosphere. "This makes a very convincing case that we have detected a stratosphere on an exoplanet," added Korey Haynes, graduate student at George Mason University in Virginia and lead author of the study. The results appeared in the *Astrophysical Journal*.