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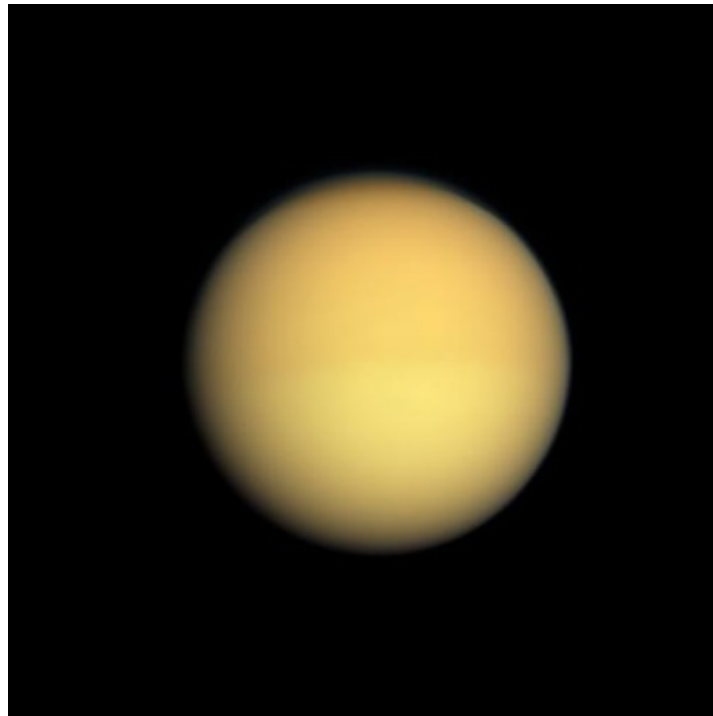
Hot titans would be Venus like worlds

KEITH COOPER
ASTRONOMY NOW

Posted: 07 September 2010

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A planetary scientist from the University of Michigan suggests that astronomers could in the future look for hot versions of Saturn's moon Titan around other stars. Sushil Atreya of the University of Michigan raised the possibility during a talk on the smog-enshrouded moon at the Exoclimates conference at the University of Exeter.



Frozen Titan would be very different were it nearer the Sun. Image: NASA/JPL/SSI

Titan, which is five-thousand kilometres in diameter, is the most intriguing moon in the Solar System. With a thick nitrogen atmosphere rich in hydrocarbons – organic compounds such as methane, ethane and acetylene – Titan is thought to contain the same organic soup that existed on Earth four billion years ago. The only difference is that the average surface temperature on Titan is minus 180 degrees Celsius, so that chemical reactions proceed at a crawl, at best.

However, Atreya considered what would happen to Titan were it to orbit a planet that migrated closer to its Sun. The vast majority of the 490 exoplanets discovered thus far are so-called 'hot jupiters', gas giants like Jupiter and Saturn that

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have travelled inwards from their birthplaces to orbit their stars closely. Furthermore, Titan is big enough that it would be called a planet were it not already in orbit around one, and could resemble terrestrial planets in other planetary systems.

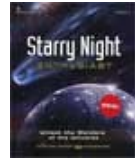
These 'hot titans', says Atreya, would retain their nitrogen rich atmospheres, but temperatures would rapidly accelerate chemical reactions, with so-called 'combustion energy' dominating, wherein chemical reactions produce heat (as on Earth). The surface would grown warm, and carbon soot and sulphur would fill the atmospheres. However, thanks to heating from its nearby parent star plus abundant greenhouse gases, a hot titan would not produce an Earth-like paradise. "The bottom line is that [a hot titan] could look more like Venus than Earth," says Atreya.

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