

Discovery of a $5\mu\text{m}$ -Bright Spot on Titan

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ABSTRACT

The Cassini Visual and Infrared Mapping Spectrometer (VIMS) detected an unusual bright spot on Titan southeast of Xanadu during the T4 flyby (lower-left figure). The 500 kilometer diameter spot is brighter at $5\mu\text{m}$ than normal bright terrain by 30-50%. It is brighter than normal bright terrain at shorter wavelengths as well, but by a much smaller margin. The fact that the feature is unusually bright at all wavelengths implies a recent origin.

Comparison to Cassini Imaging Science Subsystem (ISS) data (lower-right figure) shows correspondence with a unique, semicircular bright feature that bounds the $5\mu\text{m}$ -bright spot to the south. The feature's symmetry seems to imply structural control. Also, the ISS image shows a crenulated margin, perhaps due to surface flows. After we knew to look, we noted that VIMS saw a bright area consistent with this bright feature on 4 other flybys. Similarly, ISS monitored this hemisphere for tens of hours during the T6 approach and saw no evidence for clouds or variability associated with the feature.

The feature might be a cloud, but its longevity implies that if it is a cloud it must be one that is somehow controlled by the surface. It is also possible that the spot might represent higher topography. The $5\mu\text{m}$ spectral window through Titan's atmosphere is not perfectly clear, so a mountainous area could peek up over enough of the absorbing air to appear brighter than the surrounding terrain. The most intriguing possibility is that the spot might be thermal in nature. Simulations show that the spectrum is consistent with an area of 180K average temperature, very near the water/ammonia eutectic temperature of 173K. This hypothesis will be tested on the T15 flyby 2006 July 2 when VIMS images the area during local night.

