

The Surface of Titan from Adaptive Optics Observations

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Abstract. Saturn's largest moon Titan is the only satellite in the Solar System with a substantial atmosphere. Photolysis of methane creates a hydrocarbon haze in Titan's atmosphere that is opaque to visible light. The new adaptive optics system on the 10-meter W. M. Keck Telescope enables us to observe Titan with a resolution of 0.04 arcseconds, or 20 resolution elements across the disk. By observing at near-infrared wavelengths that are methane band windows we can see through Titan's hydrocarbon haze to the surface beneath. Recent adaptive optics images of Titan both in broadband (J, H, and K) filters and in narrowband filters that selectively probe Titan's surface and atmosphere allow us to determine surface albedo and properties of the hydrocarbon haze layer. Future observations will include high-resolution spectroscopy coupled with adaptive optics to obtain spectra of individual surface features.