

## Variations in Titan's FUV airglow as function of the Solar Cycle and Saturn Local Time

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The Ultraviolet Imaging Spectrograph (UVIS) instrument onboard the Cassini spacecraft was used to study wavelengths in both the extreme ultraviolet (EUV 56-118 nm) and far ultraviolet (FUV 110-190 nm) domain at Saturn. UVIS observations can be used to study nitrogen airglow in Titan's upper atmosphere. Airglow occurs between an average altitude of 900-1100 km above Titan. This study focused on the FUV airglow spectrum including the LBH, VK, and Nitrogen I 1493 atomic emission line. The major sources to the airglow are solar XUV radiation and magnetospheric particle precipitation. Measurements were made with UVIS during all 126 Titan flybys at a wide range of solar incidence angles and Saturn Local Time (SLT). There were multiple observations near noon SLT, when Titan is near the magnetopause, and midnight SLT, when Titan is deep in Saturn's magnetosphere. Observations occurred at both locations during solar minima (2008 - 2009) and solar maxima (2013 -2015).

This research then compares the spectral emission from the dayglow (Solar incidence angle  $< 110^\circ$ ) and nightglow (Solar incidence angle  $\geq 110^\circ$ ) between a rayheight of 900-1200 km around noon (+/- 1 h) and around midnight (+/-1 h) SLT during solar minima and maxima. Incidence angles were selected to ensure nightglow contained no solar component, while the rayheight was selected to exclude solar reflection. Our goal is to identify characteristic traits of the dayglow, and nightglow, and determine how they vary depending on the solar cycle and the orbital (and magnetospheric) location. To do so we will examine the ratio of the V-K, LBH, and NI-1493 peaks, comparing both within the V-K band itself and against the LBH band and NI-1493 emission line. We expect that both the dayglow and nightglow V-K, LBH, and NI-1493 ratios will vary according to SLT due to the difference in magnetospheric particle precipitation between the magnetopause region and magnetotail region.