# ANALYSIS OF HIGH RESOLUTION LABORATORY PROPANE SPECTRA ($\nu_{21}$, 922 cm$^{-1}$) AND THE INTERPRETATION OF TITAN'S INFRARED SPECTRA[a].

V. KLAVANS, *Department of Astronomy, University of Maryland, College Park, MD 20742*; C. NIXON, T. HEWAGAMA, *Department of Astronomy, University of Maryland, College Park, MD 20742 at NASA Goddard Space Flight Center, Greenbelt, MD 20771*; and D. E. JENNINGS, *NASA Goddard Space Flight Center, Greenbelt, MD 20771*.

Titan has an extremely thick atmosphere dominated by nitrogen, but includes a range of trace species such as hydrocarbons and nitriles. One such hydrocarbon is propane ($C_3H_8$). Propane has 21 active IR bands covering broad regions of the mid-infrared. Therefore, its ubiquitous signature may potentially mask weaker signatures of other undetected species with important roles in Titan's chemistry. Cassini's Composite Infrared Spectrometer (CIRS) observations of Titan's atmosphere hint at the presence of such molecules. Unfortunately, $C_3H_8$ line atlases for the vibration bands $\nu_8$, $\nu_{21}$, $\nu_{20}$, and $\nu_7$ (869, 922, 1054, and 1157 cm$^{-1}$, respectively) are not currently available for subtracting the $C_3H_8$ signal to reveal, or constrain, the signature of underlying chemical species. Using spectra previously obtained by Jennings et al.[b] at the McMath-Pierce FTIR at Kitt Peak, AZ, as the source and automated analysis utilities developed for this application, we are compiling an atlas of spectroscopic parameters for propane that characterize the ro-vibrational transitions in the above bands. In this paper, we will discuss our efforts for the spectral region near the $\nu_{21}$ band, present initial results for spectroscopic parameters including absolute line intensities and transition frequencies, and show how these optical constants will be used in searching for other trace chemical species in Titan's atmosphere.

[a]This work was supported by the NASA Cassini Data Analysis Program, grant number NNX09AK55G.

[b]Nadler and Jennings, 1989, JQSRT, 42, 399.