Photochemistry and Spectroscopy of Organic Aerosols of Titan

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Photochemistry of organic-rich atmosphere of Titan has fascinated physicists, chemistry, and astronomers alike for over several decades (Sagan 1974; Khare, Sagan et al. 1986; Sagan, Thompson et al. 1992) and there remains still a lot to be understood (Lavvas, Coustenis et al. 2008; Bezard 2009).

In our "Ice Spectroscopy Laboratory" at JPL, we have been conducting studies to understand the influence of longer wavelength irradiation on Titan aerosol photochemistry as well as cosmic ray induced chemistry of cyanoacetylenes in surface ices.

An overview of these processes and their relevance to understand the interaction between the atmosphere and surface of Titan – especially towards the formation of astrobiologically important molecules would be discussed.

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References

[1] Bezard, B. (2009). "Composition and chemistry of Titan's stratosphere." Philosophical Transactions of the Royal Society a-Mathematical Physical and Engineering Sciences **367**(1889): 683-695.

[2] Khare, B. N., C. Sagan, et al. (1986). "AMINO-ACIDS DERIVED FROM TITAN THOLINS." Icarus **68**(1): 176-184.

[3] Lavvas, P. P., A. Coustenis, et al. (2008). "Coupling photochemistry with haze formation in Titan's atmosphere, Part II: Results and validation with Cassini/Huygens data." Planetary and Space Science **56**(1): 67-99.

[4] Sagan, C. (1974). The Atmosphere of Titan (NASA SP-340). Washington, DC, U.S. Government Printing Office.

[5] Sagan, C., W. R. Thompson, et al. (1992). "TITAN - A LABORATORY FOR PREBIOLOGICAL ORGANIC-CHEMISTRY." Accounts of Chemical Research **25**(7): 286-292.