

# Photophysics of PAHs in the Atmosphere of Titan

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Titan is the largest satellite of Saturn and the second largest satellite in the solar system. It is the only satellite in the solar system that has a dense atmosphere. Its atmosphere is dominated by N<sub>2</sub> (98% by volume), with a small amount of CH<sub>4</sub> (2% by volume) and tiny amounts of other organic molecules. The *Visual-Infrared Mapping Spectrometer* (VIMS) on board the *Cassini* spacecraft detected in the atmosphere of Titan the 3.28 μm emission feature which is believed to arise from the C-H stretching mode of polycyclic aromatic hydrocarbon (PAH) molecules. PAHs are thought to be a major constituent of the Titan haze. As the atmosphere of Titan is about 250 times more N-rich (relative to C) compared to the interstellar medium, we would expect the PAH molecules in the Titan atmosphere to be doped by one or more N atoms.

In this talk we will present our recent results on the vibrational excitation simulation of N-rich PAH molecules in the Titan atmosphere illuminated by the Sun and calculate their infrared emission spectra. We will compare the computed PAH emission spectra with that observed by *Cassini/VIMS* and derive the PAH abundance and its spatial distribution in the upper atmosphere of Titan.