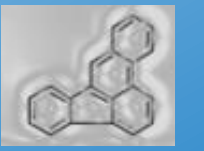




INFRARED MAPPING INTERSTELLAR MEDIUM POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)



C. Ahrens¹, C. Lisse², M. Zemcov³, A. Poppe⁴, J. Szalay⁵

¹NASA GSFC; ²JHU-APL; ³Rochester Institute of Technology; ⁴UC Berkeley; ⁵Princeton University

Polycyclic aromatic hydrocarbons (PAHs) are hydrocarbons consisting of mainly carbon and hydrogen structured in multiple aromatic rings. PAHs are discussed in multiple planetary aspects, especially their detection in Titan's hazes, including astrobiological implications.

Heliophysics Objective

- Understanding the solar wind activity across the solar system to the heliosheath would benefit the mapping of irradiative activity and by-products of that activity.
- PAHs are also detected around Herbig Ae/Be stars, which would be an interesting comparison to PAHs around our Sun.
- Another fascinating source of PAH observations is the blue hypergiant Cygnus OB2-12, one of the most luminous stars known in the galaxy.

3 – 15 μm imaging spectroscopy

**I/DI = 30 spectra over 1 – 10 mm
Spatial resolution < 30 arcsec
Survey area > 5000 degrees²**

Near-IR (< 15 microns)

Astrophysics/Dust Objective

- Continuous replenishment of PAHs via the outgassing of cometary bodies + the collisional grinding of asteroids is required to maintain the abundance of small PAHs
- PAHs have also been detected in protoplanetary disks.
- The dust model of Draine & Li (2007) required 4.7% of the total dust mass to reside in PAHs with fewer than 10^3 carbon atoms, which accounted for $\sim 10\%$ of the total interstellar carbon abundance.

Planetary/Exoplanetary Objective

- PAHs have been observed from the Cassini mission at Saturn/Titan, and at Jupiter.
- Mapping the chemical processes of PAH/tholin material on centaurs, Trans-Neptunian objects, Kuiper Belt objects (KBOs), etc.
- PAHs have also been an important observation in carbon-rich exoplanetary systems.

