



AWA meeting
December 8, 2015



***Are We Alone
in the Universe ?***



AWA meeting December 8, 2015



Spectroscopy will tell you !



Wybren Jan Buma

*Molecular Photonics
University of Amsterdam*

*High-resolution spectroscopy
and chiroptical spectroscopies*



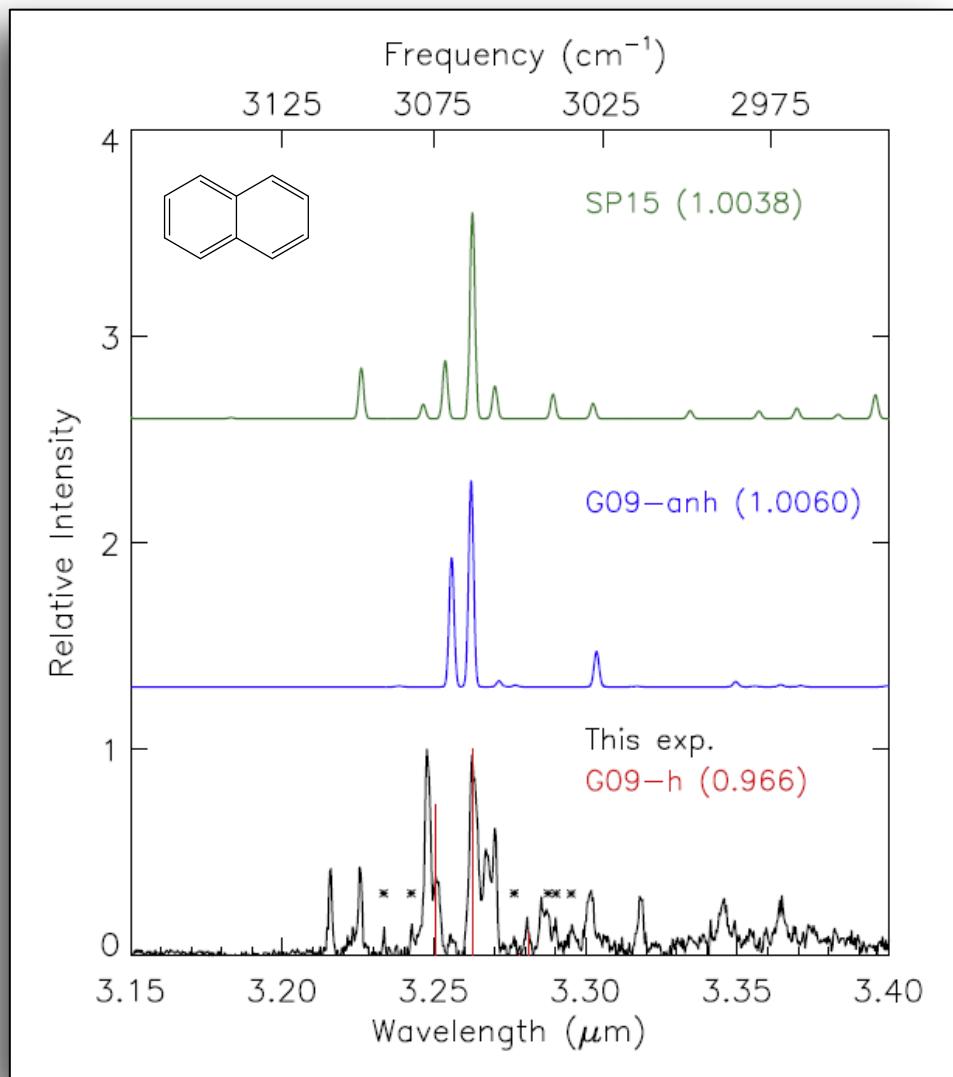
Freek Ariese

*Biophotonics
Free University Amsterdam*

Raman spectroscopy



High-resolution spectroscopy: the 3 μm band of PAHs



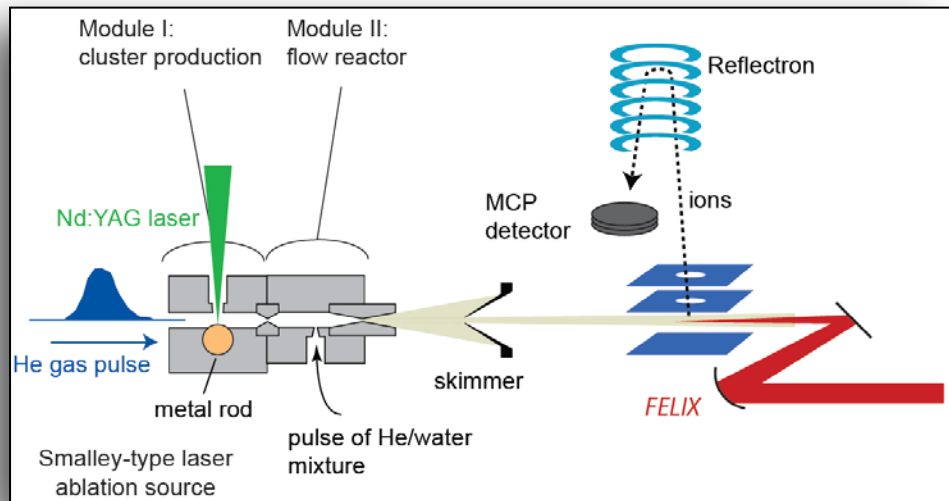
Light on:

- Two-component emission
- The elusive 3 μm plateau

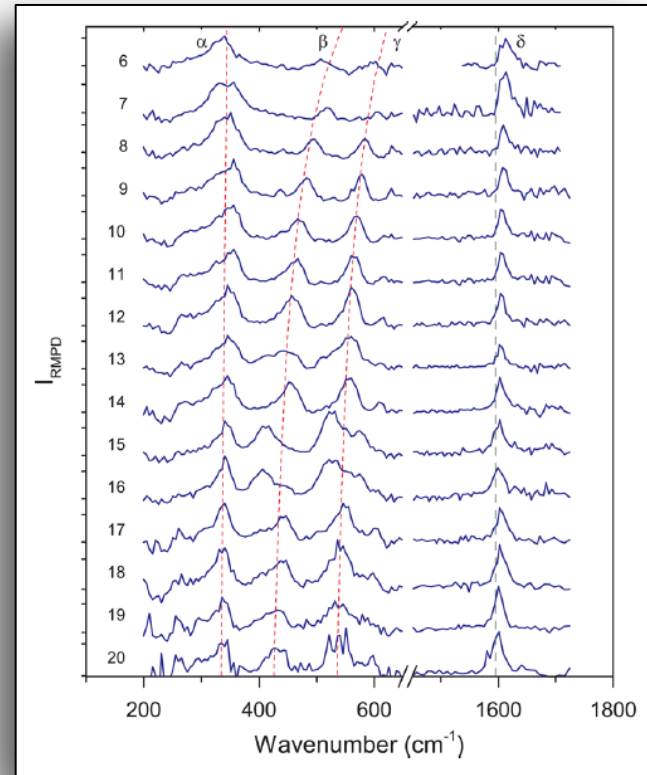
*Realistic potential for
using databases to
unravel PAH evolution*



High-resolution spectroscopy: IR signatures of nanoclusters



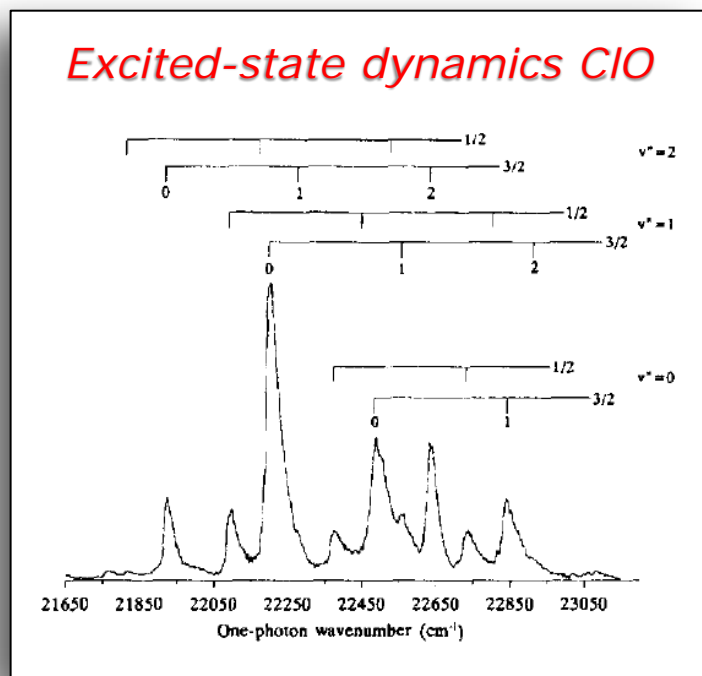
- Generation of neutral and charged clusters *from single atoms to 'bulk'*
- Reaction dynamics on nanoclusters
- IR and UV spectroscopy



Presently extensive research program on
signatures Fe, FeS, Al, Al oxides, etc.



High-resolution spectroscopy: atmospheric relevance



Same techniques employed in the past to determine

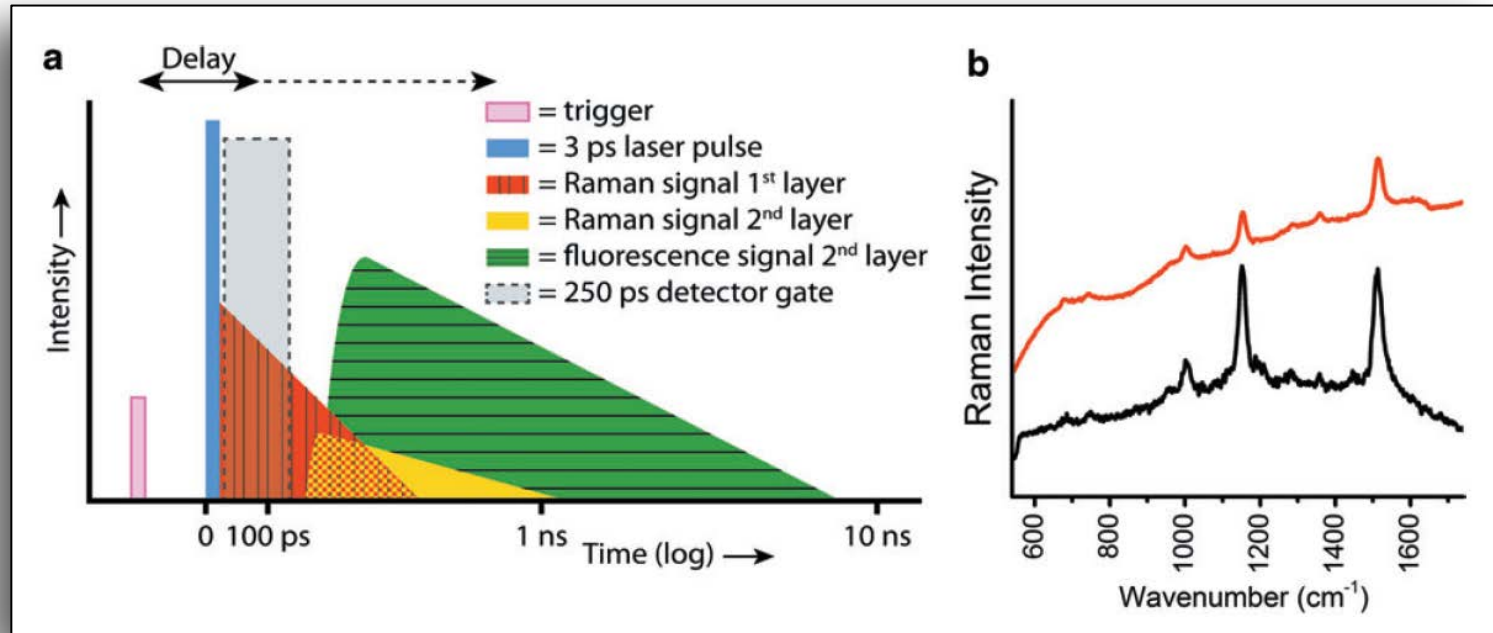
*spectroscopic properties,
dynamics and reactivity*

of lots of small molecules and radicals of (earth-)atmospheric relevance and planetary bodies such as Titan

*Powerhouse of expertise to
elucidate chemistry of
atmospheres with spectroscopy*



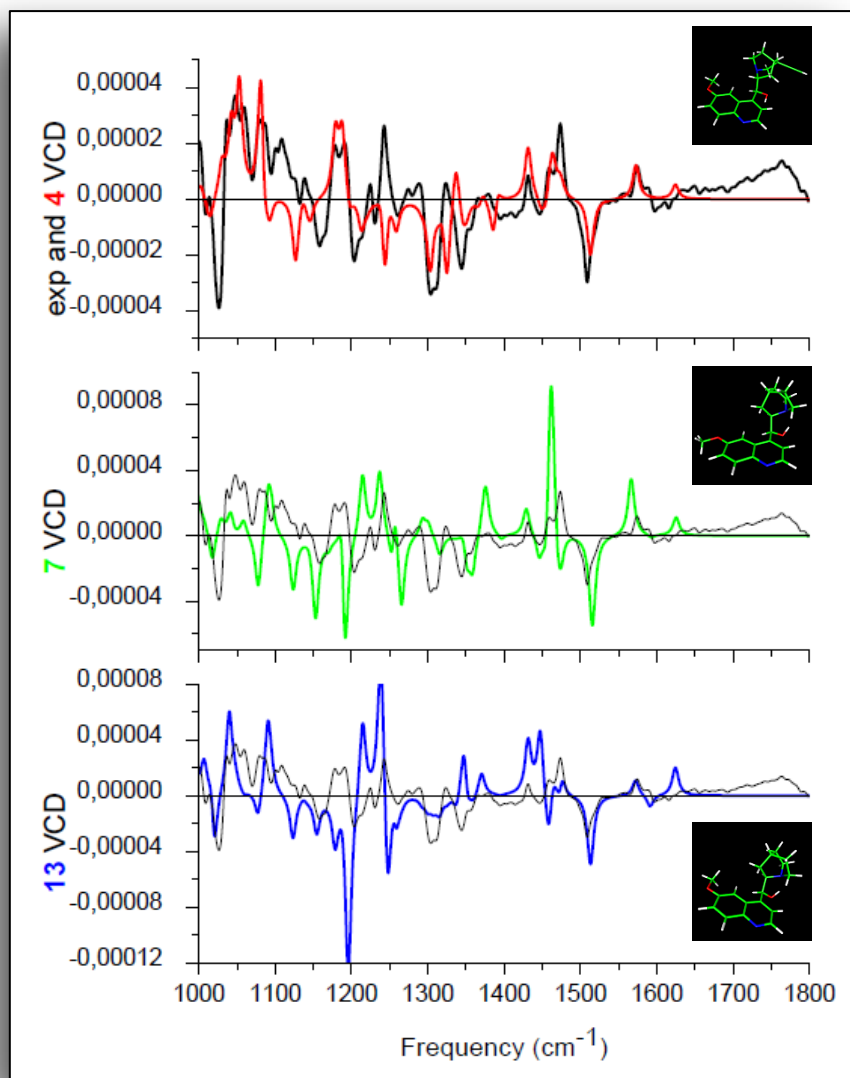
Raman spectroscopy: profiling the (sub)surface



- *Non-invasive* method to obtain chemical information
- No interference from water
- *Remote and through-surface* sensing
- Application as *Raman Lidar* in atmospheric studies



Chiroptical spectroscopies: finding signatures of life



- Electronic and vibrational circular dichroism unique probes for *chirality*
- Direct *fingerprint* chemical composition and structure
- Remote detection as required for extra-terrestrial studies by working in *scattering mode*



Embedding



- Active in Dutch Astrochemistry Network (*DAN*)
- Active in Planetary and Exoplanetary Science Network (*PEPSci*)

- Access to unique spectroscopic equipment and expertise through
 - *LaserLab Amsterdam* (Buma program manager Analytical Chemistry and Spectroscopy)
 - *Free Electron Lasers for Infrared Experiments (FELIX)@RU*

- Extensive worldwide network of collaborations with forefront players in the field