

# 30 Years of Photodissociation Regions:

A symposium to honor David Hollenbach's lifetime in science  
Asilomar, CA, USA - June 28<sup>th</sup> to July 3<sup>rd</sup>, 2015

## Cometary Photodissociation Regions

Steven B. Charnley<sup>1</sup>, Martin A. Cordiner<sup>1</sup> and Stefanie N. Milam<sup>1</sup>

<sup>1</sup> Astrochemistry Laboratory, Solar System Exploration Division, Code 691, Science and Exploration Directorate, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA

e-mail: [steven.b.charnley@nasa.gov](mailto:steven.b.charnley@nasa.gov)

Cometary ices contain material left over from the birth of the solar system, and studying their composition provides an important source of information regarding the physical and chemical conditions of the early Solar Nebula. Sublimation of nuclear ices near perihelion generates a large photodissociation region - the coma of gas and dust. Modeling of this multi-fluid plasma requires consideration of a variety of chemical processes, such as photodissociation, photoionization and ion-molecule reactions. Compositional studies, from ground and space, especially of organic molecules, isotopologues, and ortho-para ratios can provide important clues as to their origins. This presentation will summarize recent observational and theoretical developments in cometary chemistry.

### REFERENCES

Ehrenfreund, P. & Charnley, S.B. (2000), *Annu. Rev. Astron. Astrophys.*, 38, 429  
Mumma, M. J. & Charnley, S.B. (2011), *Annu. Rev. Astron. Astrophys.*, 49, 471.