30 Years of Photodissociation Regions:

A symposium to honor David Hollenbach's lifetime in science

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Spatially resolved physical conditions of molecular gas: a zoom-in from circumnuclear region of M83 to Carina nebula

Ronin Wu[1], Suzanne Madden[2], Frédéric Galliano[2], Christine Wilson[3], Takashi Onaka[1] and Tomohiko Nakamura[1]

[1] Department of Astronomy, the University of Tokyo, Bunkyo-ku, Tokyo, 113-0033, Japan

[2] Laboratoire AIM, CEA Saclay, 91191 Gif-sur-Yvette, France

[3] Department of Physics and Astronomy, McMaster University, Hamilton, ON, L8S 4M1 Canada

e-mail: ronin.wu@astron.s.u-tokyo.ac.jp

Since the launch of the Herschel Space Observatory (Pilbratt et al. 2010), our understanding about the photodissociation regions (PDR) has taken a step forward. In the bandwidth of the Fourier Transform Spectrometer (FTS) of the Spectral and Photometric Imaging REceiver (SPIRE) on board Herschel, ten CO rotational transitions, including $J = 4 - 3$ to $J = 13 - 12$, and three fine structure lines, including [CI] 609, [CI] 370, and [NII] 250 μm, are covered. This presentation focuses on the physical conditions of molecular gas probed by the Herschel SPIRE/FTS.

Based on the spatially resolved physical parameters derived from the CO spectral line energy distribution (SLED) map and the comparisons with the dust properties and starformation tracers, I will first present our findings at the circumnuclear region of M83 (Wu et al. 2015), and then zoom in toward the molecular cloud near a young open cluster, Trumpler 14, in Carina nebula. I will discuss (1) the potential of using [NII] 250 and [CI] 370 micron as starformation tracers; (2) the reliability of tracing molecular gas with CO (3) the excitation mechanisms of warm CO (4) the possibility of studying stellar feedback by tracing the thermal pressure of intersetllar molecular gas.

REFERENCES

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