

30 Years of Photodissociation Regions:

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

Shocks and PDRs from Young Stellar Objects with *Herschel*

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David Hollenbach's pioneering models of shocks and PDR's and their emergent infrared spectra set the groundwork for the interpretation of the spectacular molecular and atomic spectra of young stellar objects obtained with *Herschel*. In particular, a series of diagnostics were proposed in Hollenbach & McKee (1989) to distinguish between *J*-type shocks, *C*-type shocks, and PDRs, which can now be tested against observations from the Photoconductor Array Camera and Spectrometer (PACS) instrument.

The major *Herschel* / PACS surprise was the large abundances of warm and hot gas ($T > 300$ K) in low-mass protostars, indicating that these are feeding back on their parental material in unexpected ways (Karska et al. 2013, 2014b, in prep.). I will summarize the observations and present an overview of where we currently stand in our understanding of energetic processes in low-mass protostars. The interpretation of the data will be based on a simple radiative-transfer analysis and comparisons to available shock and PDR models, with a brief discussion of the results from the more sophisticated and detailed physicochemical models. One of the key results, in terms of feedback processes, is that we need to combine the chemistry of PDRs with the physics of shocks to fully understand and interpret the PACS data, thereby combining two of David Hollenbach's primary scientific interests.

REFERENCES

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