30 Years of Photodissociation Regions:
A symposium to honor David Hollenbach's lifetime in science
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Molecular Pillars in the Sky and in the Lab (part 1)

Marc W. Pound[1], Mark G. Wolfire [1], Jave Kane[2], and David Martinez[2]

[1] Astronomy Department, University of Maryland, College Park, MD 20742

[2] Lawrence Livermore National Laboratory, 7000 East Ave., Livermore, CA 94550

e-mail: mpound@umd.edu

A collaboration between astronomers at the University of Maryland and scientists at Lawrence Livermore National Laboratory has been investigating the origin and dynamics of the famous Pillars of the Eagle Nebula and similar structures at the boundaries of HII regions and molecular clouds. This approach has combined observations, theory, and radiative hydrodynamic simulations.

A long-term goal of this work is to field a High Energy Density Laboratory Astrophysics (HEDLA) experiment on the National Ignition Facility (NIF) which can recreate pillars in the lab with the astrophysically relevant scaling parameters. More immediately, we are creating a robust target that can produce a pillar, testing our new long-duration radiation source, and developing improved experimental diagnostics.

In this talk, I will review the theories of how molecular pillars may form, present results from recent CARMA observations of the pillars in Eagle and Pelican nebulae, and compare the data to results from numerical simulations. Finally, I will motivate the insights that a HEDLA experiment can provide in understanding the formation and dynamics of molecular pillars.

A follow-on talk by Jave Kane will present results of recent Eagle HEDLA experiments, and a related poster by David Martinez gives some detail on the experiment platform.