

Abstract Submitted
for the SES13 Meeting of
The American Physical Society

A Survey of Hidden Molecular Clouds in the Milky Way¹ JAMES HUGHES, STEVEN GIBSON, Western Kentucky University — It is critical to understand the internal processes of galaxies, such as star formation, which occurs in the coldest, densest interstellar clouds. Unlike stars, these clouds are difficult to detect in visible light, but radio and infrared telescopes allow observations of the gas and dust particles they contain. In regions of the galaxy, ambient neutral atomic hydrogen gas is forming molecules, a sign of condensing clouds. We are interested in these clouds as precursors to stellar evolution where molecular hydrogen is critical. However, it is difficult to observe molecular hydrogen directly. Thus, proxy detectors such as carbon monoxide (CO) are used as indicators of molecular hydrogen. This method is not flawless. Through a comparative study, we propose substantial dark molecular hydrogen is not detected with current methods. We use far-infrared dust emission measurements from the IRAS and the Planck satellites for two independent measures of total column density. We trace visible gas column density using radio 21-cm hydrogen emission from Arecibo and 3-mm CO data from multiple surveys. Without dark gas, the dust and visible gas column densities should be equivalent. As this is not the case, there is evidence for dark molecular hydrogen overlooked in standard observations.

¹We acknowledge the Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Western Kentucky University, and the National Science Foundation.

James Hughes
Western Kentucky University

Date submitted: 19 Sep 2013

Electronic form version 1.4