

Title: A Spitzer Survey of an Isolated Globule: DC314.8-5.1
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Abstract

DC314.8-5.1 is an isolated globule in the constellation of Circinus in the Southern Hemisphere. A 10th magnitude B9 star is illuminating a reflection nebula in the eastern part of this cloud. Using this fortuitous association Whittet (2007) found the distance, mean number density of hydrogen and mass to be 342 /pc 50 pc, $> 9 \times 10^3 \text{ cm}^{-3}$ and $30 \sim 100$ solar masses, respectively. We surveyed this cloud using data from Spitzer's IRS, IRAC and MIPS instruments. The main goals of our survey are to use mid-IR photometry along with 2MASS data to determine if this globule is a site of active star formation and to use IR spectroscopy to detect PAHs and investigate the energetics in the cloud. Results from the analysis of these data will lead to a better understanding of the interaction of dense molecular gas and dust in isolated cloud cores with a well defined soft UV radiation fields. In this poster we describe some preliminary results from the investigation of PAH emissions in DC314.8-5.1. Inspection of the IRAC 8 μm image shows widespread structured PAH emission toward this cloud. We have high resolution IRS spectra of HD130079 and low resolution IRS maps of the reflection nebula. In the spectral data we detect all the major PAH emissions in the $5 \sim 20 \mu\text{m}$ region. We find that the emission in the 12 to 14 μm region is quenched compared to the 11.3 μm feature suggesting that most of the PAHs possess solo hydrogen bonds. Spatial variation of PAH emissions seems to be identical as we move from the illuminating source, HD130079, towards the interior of the cloud except in the south-southwest region, where we see a slight enhancement. This enhancement is probably due to the skin effect (i.e., in this direction we are viewing the edge of the cloud leading to an excess of PAH emission along the line of sight.) At present, we are analyzing the ratios of various PAH features to i) put this globule in a global context with respect to the energetics of the region, and ii) determine the ionization state of the carrier molecules to investigate the interaction of PAHs with soft UV radiation. Combining the results from the spectroscopic program with the stellar census data from 2MASS, IRAC and MIPS will provide new insight into the physical and evolutionary state of this isolated globule.