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Pre-stellar Cores in the Aquila Rift

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The Herschel Space Observatory, Herschel, is a flagship mission of the European Space Agency operational from 2009-2013 with Canadian participation supported by the Canadian Space Agency. Herschel has enabled ground-breaking astrophysical observations through providing the first unfettered access to the far-infrared region of the electromagnetic spectrum. The Herschel Gould Belt Survey (GBS) has provided a wealth of data to further our understanding of star formation including the provision of data-sets which contains several observations of stellar and pre-stellar cores. The Aquila Rift region, a subset of the Herschel GBS, contains some 77 pre-stellar cores at various stages of development. This work combines photometric data from Herschel (both the Spectral and Photometric Imaging Receiver (SPIRE) and the Photoconductor Array Camera (PACS) instruments) with high resolution heterodyne spectroscopy of CO emission recorded with the instrumentation suite at the James Clerk Maxwell Telescope (JCMT). The high resolution CO emission was observed at the JCMT with the RxA (CO J2-1) and HARP (CO J3-2) receivers. The CO emission spectra allow the determination of the distribution and relative velocity of cold gas in these prestellar cores. The CO results are then compared to photometric results (e.g., dust temperature, emissivity, opacity) obtained through Herschel observations of the same sources. The analysis of these data provide further details towards the understanding and characterization of the evolution of star formation from pre-stellar cores to class 1 protostars and beyond.

Author: Mr SCOTT, Jeremy (Student at the University of Lethbridge)

Co-authors: Dr MAKIWA, Gibion (postdoctoral researcher); Prof. SPENCER, Locke (Supervisor)

Presenter: Mr SCOTT, Jeremy (Student at the University of Lethbridge)

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