

HERSCHEL OBSERVATIONS OF EXTRA-ORDINARY SOURCES (HEXOS): ANALYSIS OF THE HIFI 1.2 THZ WIDE SPECTRAL SURVEY TOWARD ORION KL

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We present a full spectral survey of the Kleiman-Low nebula within the Orion Molecular Cloud (Orion KL), one of the most chemically rich regions in the galaxy, using the HIFI instrument on board the Herschel Space Observatory. These observations span a frequency range of 490 – 1240 GHz and 1430 – 1900 GHz at a spectral resolution of 1.1 MHz (corresponding to 0.7-0.2 km/s). These observations encompass the largest spectral coverage ever obtained of a star-forming region in the sub-mm with high spectral resolution. As a result, we are sensitive to lines with excitation energies over an unprecedented range observed with the same instrument and near uniform efficiency. Reliable multi-transitional studies using hundreds to thousands of lines emitted by the same molecule can therefore be carried out. We will present the results of a full band analysis of this survey exploring the spectral emissions of over 20 molecules within this range. Initial results hint at the presence of excitation gradients. In addition, some species exhibit emissions at very high energies (> few hundred K) and temperatures, while others only probe warm (~100 K) regions along the line of sight. These facets will be combined with an exploration of molecular origins in hot gas.