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The JCMT Legacy Survey: Mapping the Milky Way in the Submillimetre

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Abstract. The JCMT Legacy Survey (JLS) is an ambitious programme of independent surveys to study our Galaxy and universe in the submillimetre ($\lambda = 450 - 850\,\mu$m) from the summit of Mauna Kea, Hawaii. With its scientific breadth and unique spectral window, it is clear that the JLS will have a significant impact on star formation studies in the near future and beyond. Its complementarity with other surveys (e.g. Spitzer, Herschel) will make the JLS a very valuable resource for multi-wavelength studies for low and high-mass star formation across the Milky Way. The JLS is currently in its second year of operation.

The JLS comprises seven projects whose scientific objectives are to understand the formation and evolution of the planets, stars and galaxies in the Universe. Four projects will survey within the Milky Way, one will survey galaxies in the local universe, another will perform a deep cosmological survey, and there is an ambitious survey to map the whole submillimetre sky viewable from Mauna Kea. There are 3 projects specifically aimed at surveying the star formation content in our Galaxy: The Gould Belt Survey (GBS) will map the gas and dust content of all the major regions of low mass star formation within 500 pc of the Sun; the Spectral Legacy Survey (SLS) will obtain a chemical census from a range of known star formation environments; the JCMT Plane Survey (JPS) will obtain a deep (4 mJy at 850 μm) map of the spine of the Galactic plane.

Of these, the GBS and SLS have already begun (using HARP/ACSIS). Observations of the star formation content of the Serpens molecular cloud reveals in some detail how explosive star formation can be. Outflows can be seen breaking out in all directions from the central core (Hogerheijde *et al.* 2009) depositing significant energy and momentum into the natal cloud, a visual demonstration of the importance of feedback in star formation. In the Orion Bar, observations of key chemical species are revealing over and under abundances when compared to chemical models of photo-dissociation regions, forcing a refinement of these models to include processes such as depletion and evaporation from icy grain mantles (van der Wiel *et al.* 2009).

In 2010, we expect to start using SCUBA-2 for the JLS. The GBS will map all the star forming clouds within the Gould Belt as well as determining the magnetic field configuration in a few select clumps and cores. The JPS will initially map the GLIMPSE and FCRAO Outer Galaxy regions, before embarking on a complete, deep map of the Galactic plane (b= $\pm 0.5^o$). The JPS will detect a 1 $M_\odot$ object at 3 kpc and 40 $M_\odot$ objects out to 20 kpc, making the survey sensitive to almost all the massive star formation in the Galaxy. The SCUBA-2 "All-Sky" Survey (SASSy) will provide a shallower but broader survey of the Galactic Plane (b = $\pm 5^o$) down to 30 mJy at 850 μm before moving onto an ambitious phase of mapping the whole submillimetre sky viewable from Mauna Kea.