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The Galactic star formation rate as seen by the *Spitzer Space Telescope*

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Abstract. We present preliminary results of a study to determine the star formation rate of the Galaxy using a census of young stellar objects (YSOs) in the *Spitzer*/GLIMPSE and MIPSGAL surveys, which cover nearly 300 square degrees of the Galactic mid-plane. We find a value of $1.7\,M_\odot$/yr, consistent with independent estimates.

Most existing estimates of the star formation rate of our Galaxy rely on tracers of the massive star population, such as the total ionising flux in HII regions (Smith *et al.* 1978; $5\,M_\odot$/yr), γ-rays from radioactive ^{26}Al, which traces nucleosynthesis in massive stars (Diehl *et al.* 2006; $4\,M_\odot$/yr), or free-free emission (Murray & Rahman 2009; $1.3\,M_\odot$/yr). The project described here aims to determine the Galactic star formation rate by directly counting YSOs detected in the *Spitzer*/GLIMPSE survey of the Galactic plane ((Benjamin *et al.* 2003)) and producing a model of Galaxy-wide star formation that reproduces the observed number of YSOs.

A synthetic population model was constructed by randomly sampling the position of young stars in the Galactic plane, weighted by a radially dependent star formation rate (Boissier & Prantzos 1999). The synthetic young stars are then randomly assigned masses from an IMF (Kroupa *et al.* 2001), ages from a constant star forming history, and corresponding colours and magnitudes using model SEDs (Robitaille *et al.* 2006). The magnitudes are scaled by the distance and extinction along the line of sight to the Sun, assuming a double exponential distribution for the dust (Misiriotis *et al.* 2006). Brightness and colour selection criteria matching those of a census of YSOs in the GLIMPSE survey (Robitaille *et al.* 2008) were applied, and the overall number of synthetic YSOs was adjusted until the number of 'selected' synthetic YSOs matched the observations. The resulting Galactic star formation rate is $1.7\,M_\odot$/yr, in agreement with existing estimates.

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