Star Formation throughout the Galaxy
as seen by the Spitzer Space Telescope

Thomas Robitaille
(Harvard-Smithsonian Center for Astrophysics)

Barbara Whitney and the GLIMPSE team
What is the star formation rate of the Milky Way?
What is the star formation rate of the Milky Way?

5 $M_{\text{sun/yr}}$

(Smith et al, 1978)
What is the star formation rate of the Milky Way?

$5 \, \text{M}_{\text{Sun/yr}}$ (Smith et al., 1978)

$4 \, \text{M}_{\text{Sun/yr}}$ (Diehl et al., 2006)
What is the star formation rate of the Milky Way?

5 $M_{\text{sun}}$/yr
(Smith et al, 1978)

4 $M_{\text{sun}}$/yr
(Diehl et al, 2006)

2.7 $M_{\text{sun}}$/yr
(Misiriotis et al, 2006)
What is the star formation rate of the Milky Way?

- $5 \, \text{M}_{\text{Sun}}/\text{yr}$ (Smith et al, 1978)
- $1.3 \, \text{M}_{\text{Sun}}/\text{yr}$ (Murray & Rahman, 2010)
- $4 \, \text{M}_{\text{Sun}}/\text{yr}$ (Diehl et al, 2006)
- $2.7 \, \text{M}_{\text{Sun}}/\text{yr}$ (Misiriotis et al, 2006)
How do we measure galaxy-wide star formation rates?
Can we measure the Milky-Way star formation rate directly from young stars?
THE INFRARED MILKY WAY: GLIMPSE
(3.6–8.0 microns)

Robitaille et al (2008)
GLIMPSE

Pop. Synth. Model

Apply Selection Criteria

Adjust SFR

Compare Number of YSOs
0.68-1.45 $M_{\text{sun/yr}}$

(Robitaille et al., 2010)
Adjust SFR, IMF, extinction, spatial distribution, etc.

Compare all properties

Apply Selection Criteria

Pop. Synth. Model

GLIMPSE

UKIDSS

MSX

Herschel
We can measure the Galactic SFR directly from YSOs 0.68-1.45 \( M_{\text{sun}}/\text{yr} \) (Robitaille et al., 2010)
We can measure the Galactic SFR directly from YSOs

\[0.68 - 1.45 \, \text{M}_{\text{sun}}/\text{yr}\]

(Robitaille et al., 2010)

Accuracy will improve with sensitivity
We can measure the Galactic SFR directly from YSOs

0.68-1.45 M\textsubscript{sun}/yr

(Robitaille et al., 2010)

Accuracy will improve with sensitivity

By fitting the longitude, latitude, magnitude, and color distribution of YSOs in multiple surveys simultaneously, we will be able to constrain not only the star formation rate, but the spatial and intrinsic properties of YSOs.