

Observation Status of Pa α Galactic Plane Survey

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Whole region

$l = +280^\circ$ to $+350^\circ$

$l = +350^\circ$ to $+050^\circ$

$l = +050^\circ$ to $+110^\circ$

$l = +110^\circ$ to $+170^\circ$

$l = +170^\circ$ to $+230^\circ$

RCW 57 ($2^\circ \times 2^\circ$ area)

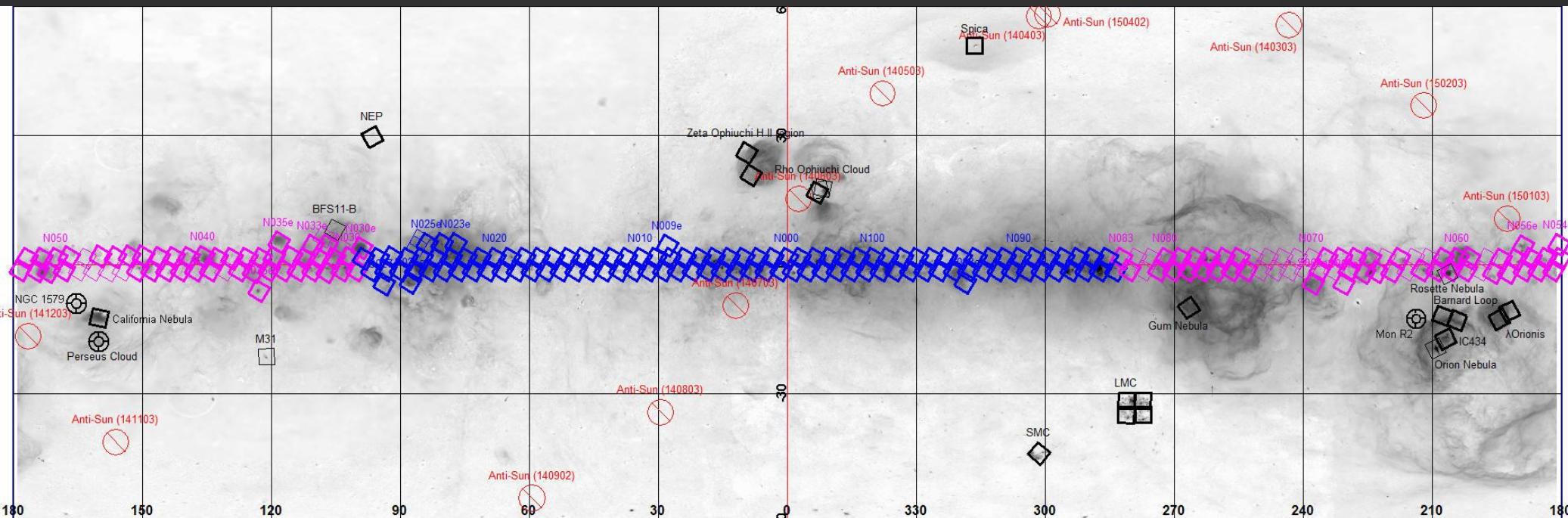
03 Pa α Pointing Observations

Summary & Future Work

Plan & Current Status

- ◆ Cover 360° along Galactic plane within $-3^\circ < b < +3^\circ$
- ◆ Total 232 fields: 106 north fields + 106 south fields + 20 extended.
- ◆ Effective exposure: ~20 minutes per field per filter.

H α image (Finkbeiner, 2003)

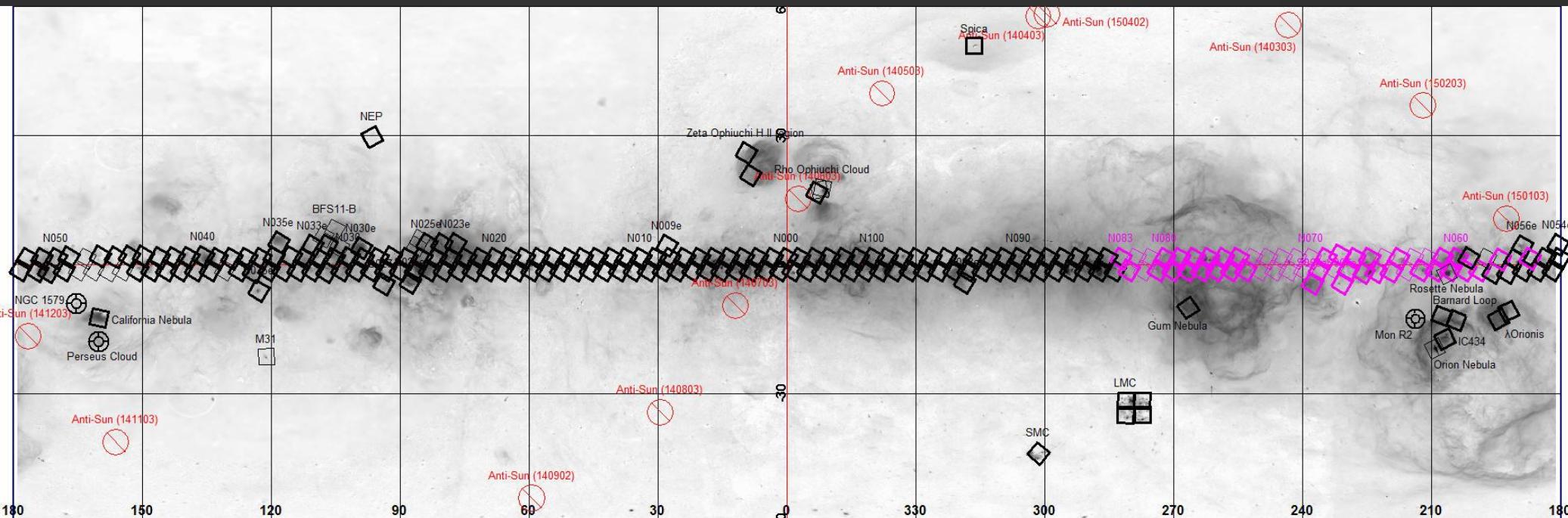


- ◆ 2014 Apr.–2014 Aug.: $l = -80^\circ$ to $+100^\circ$ (completed).
- ◆ 2014 Nov.–2015 Mar.: $l = +100^\circ$ to $+280^\circ$ (on going).

Plan & Current Status

- ◆ Cover 360° along Galactic plane within $-3^\circ < b < +3^\circ$
- ◆ Total 232 fields: 106 north fields + 106 south fields + 20 extended.
- ◆ Effective exposure: ~20 minutes per field per filter.

H α image (Finkbeiner, 2003)

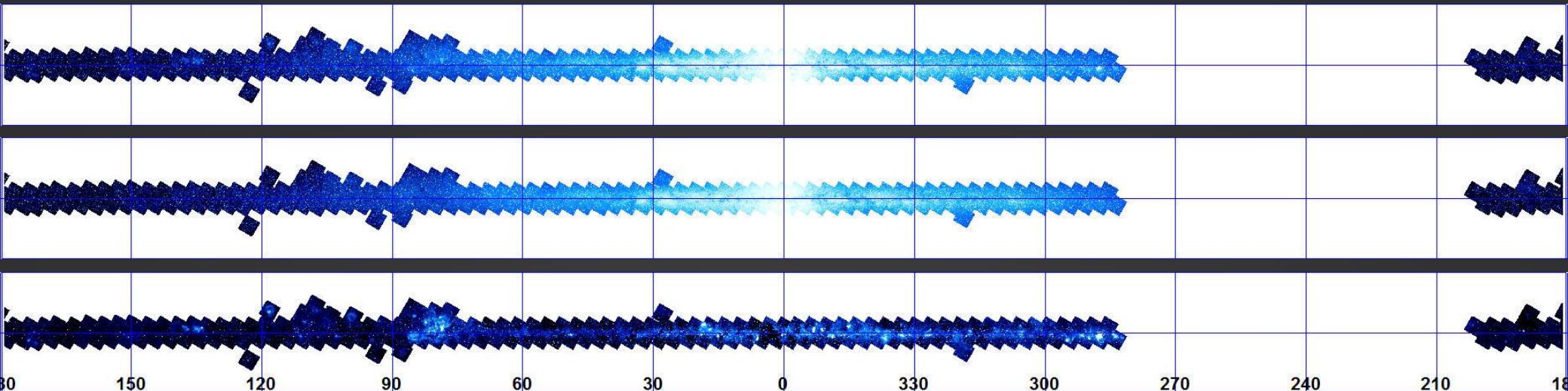


- ◆ Up to 2015 Jan. 26,

179 fields have been covered (~77.2% completed).

◆ Whole region

Top : Pa α line filter (PAAL) image
Middle : Pa α dual continuum filter (PAAC) image
Bottom : Pa α emission line (PAAL–PAAC) image



- **Incompletely processed** images : no removal of detector background, no on-orbit flat field correction, no flux calibration.
- Pa α emission line image was made using **fixed scale factor** (0.55) subtraction : PAAL – 0.55 × PAAC.

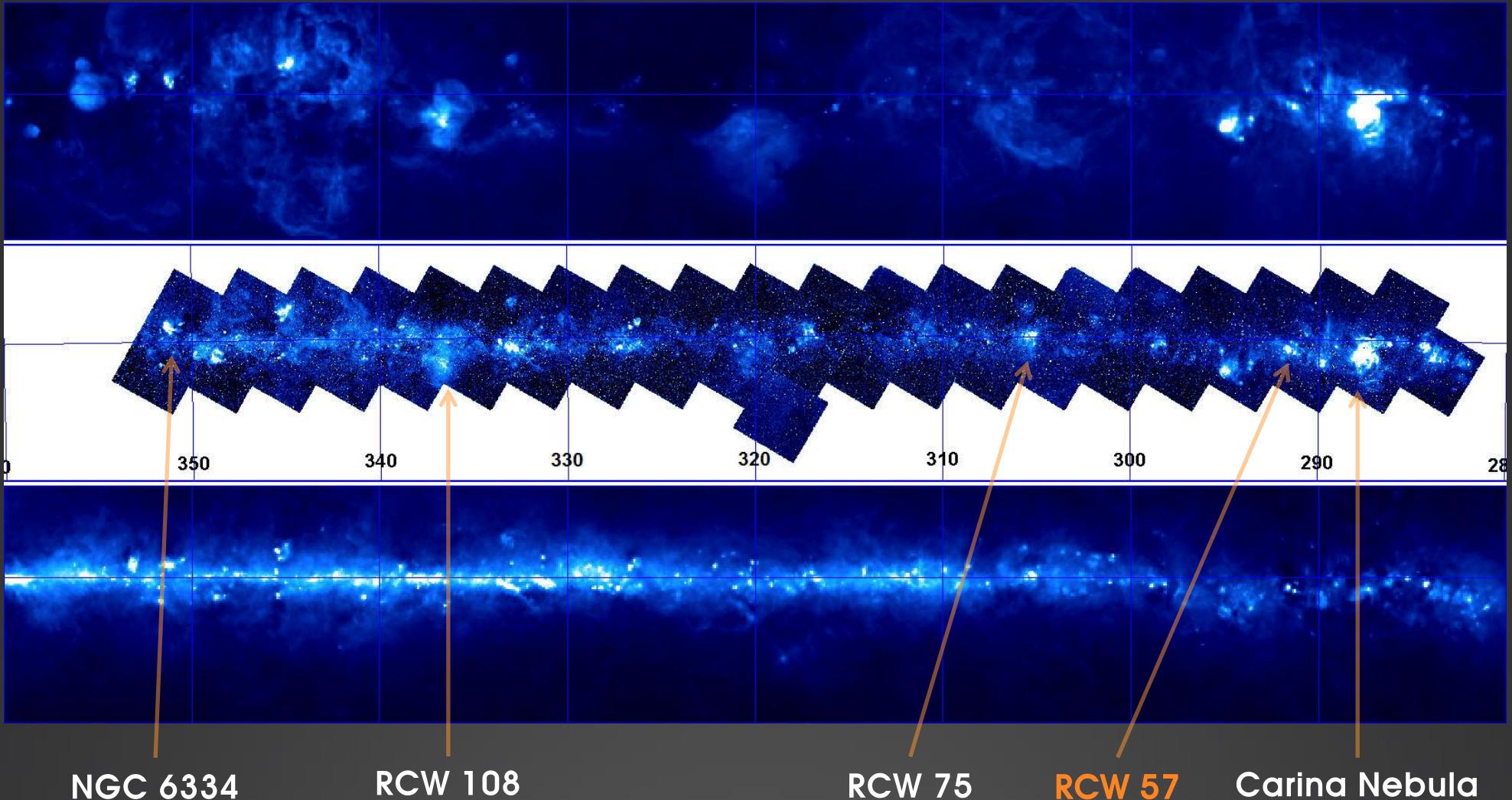
Preliminary Results

◆ $l = +280^\circ$ to $+350^\circ$

Top : H α image (Finkbeiner, 2003)

Middle : MIRIS Pa α image

Bottom : SFD E(B-V) dust image (Schlegel et al. 1998)



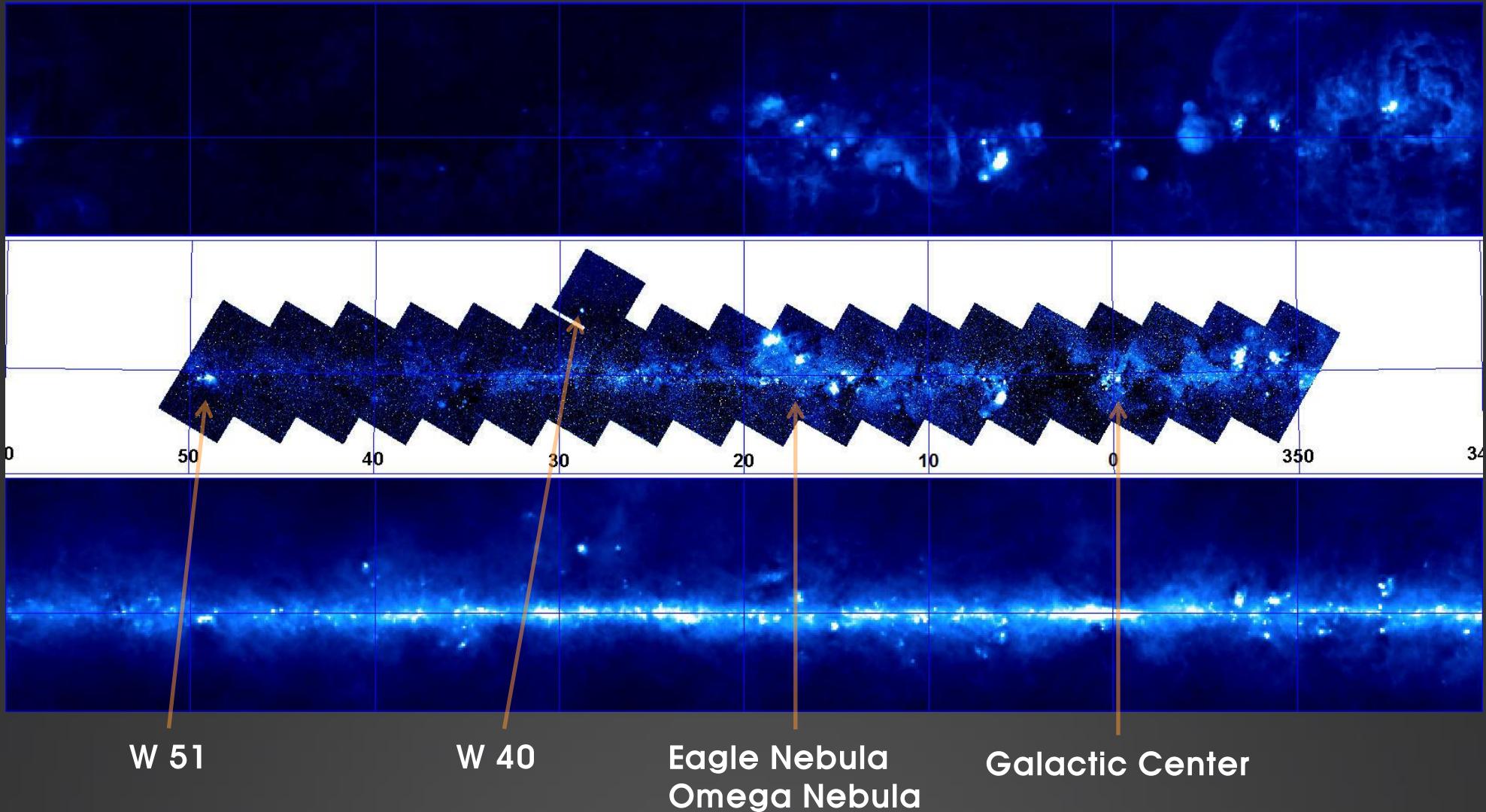
Preliminary Results

◆ $l = +350^\circ$ to $+050^\circ$

Top : H α image (Finkbeiner, 2003)

Middle : MIRIS Pa α image

Bottom : SFD E(B-V) dust image (Schlegel et al. 1998)



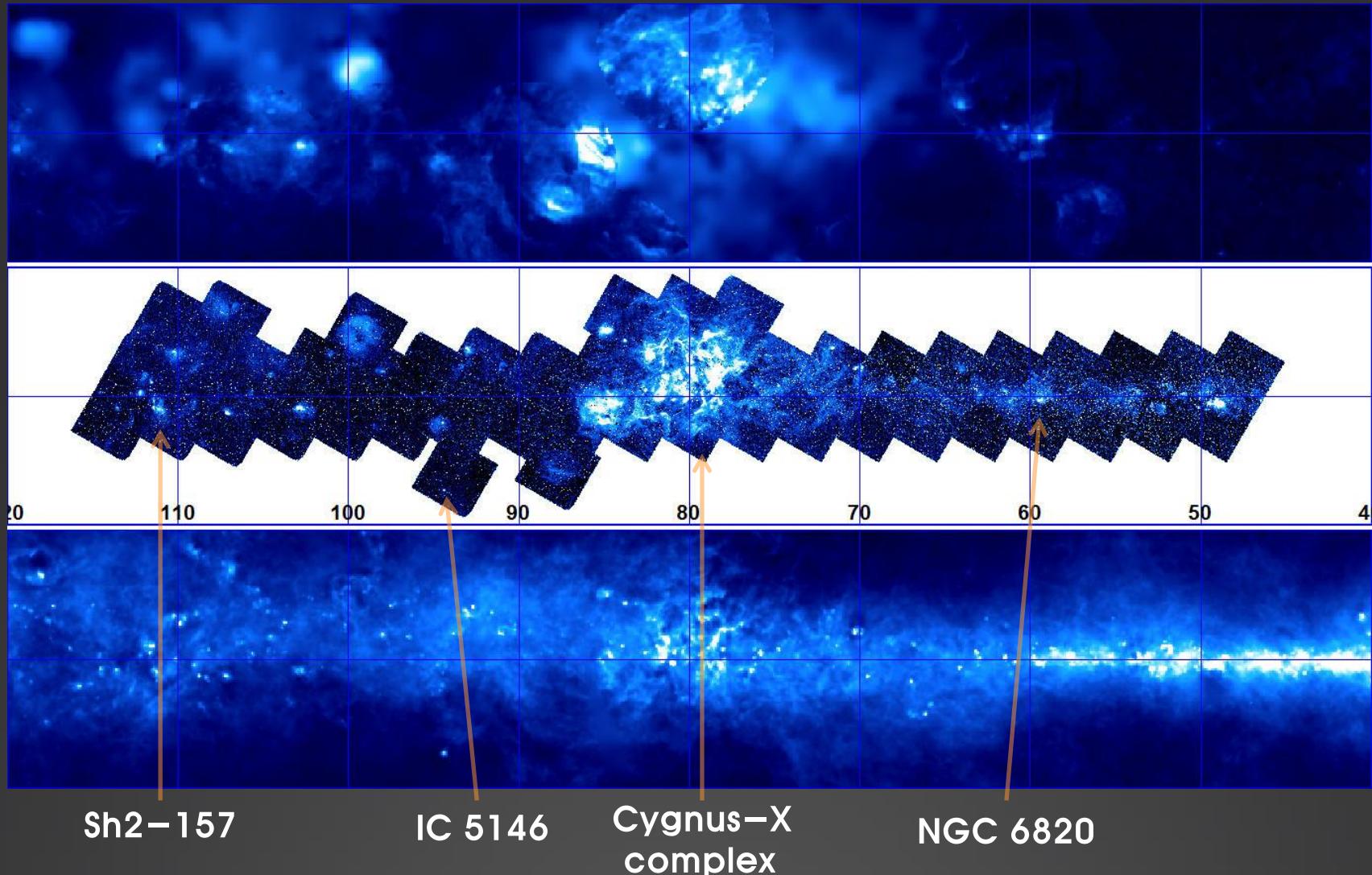
Preliminary Results

◆ $l = +050^\circ$ to $+110^\circ$

Top : H α image (Finkbeiner, 2003)

Middle : MIRIS Pa α image

Bottom : SFD E(B-V) dust image (Schlegel et al. 1998)



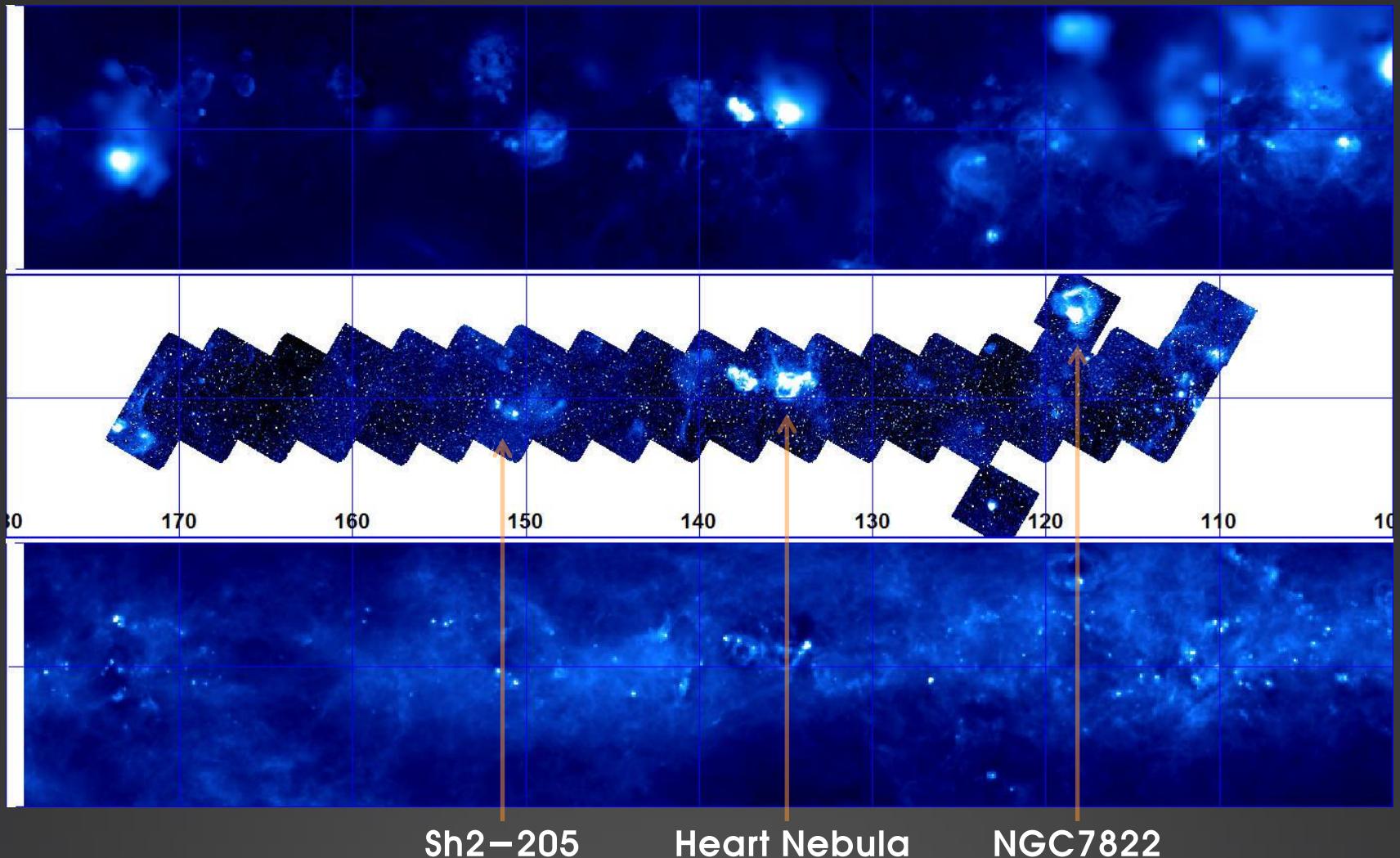
Preliminary Results

◆ $l = +110^\circ$ to $+170^\circ$

Top : H α image (Finkbeiner, 2003)

Middle : MIRIS Pa α image

Bottom : SFD E(B-V) dust image (Schlegel et al. 1998)



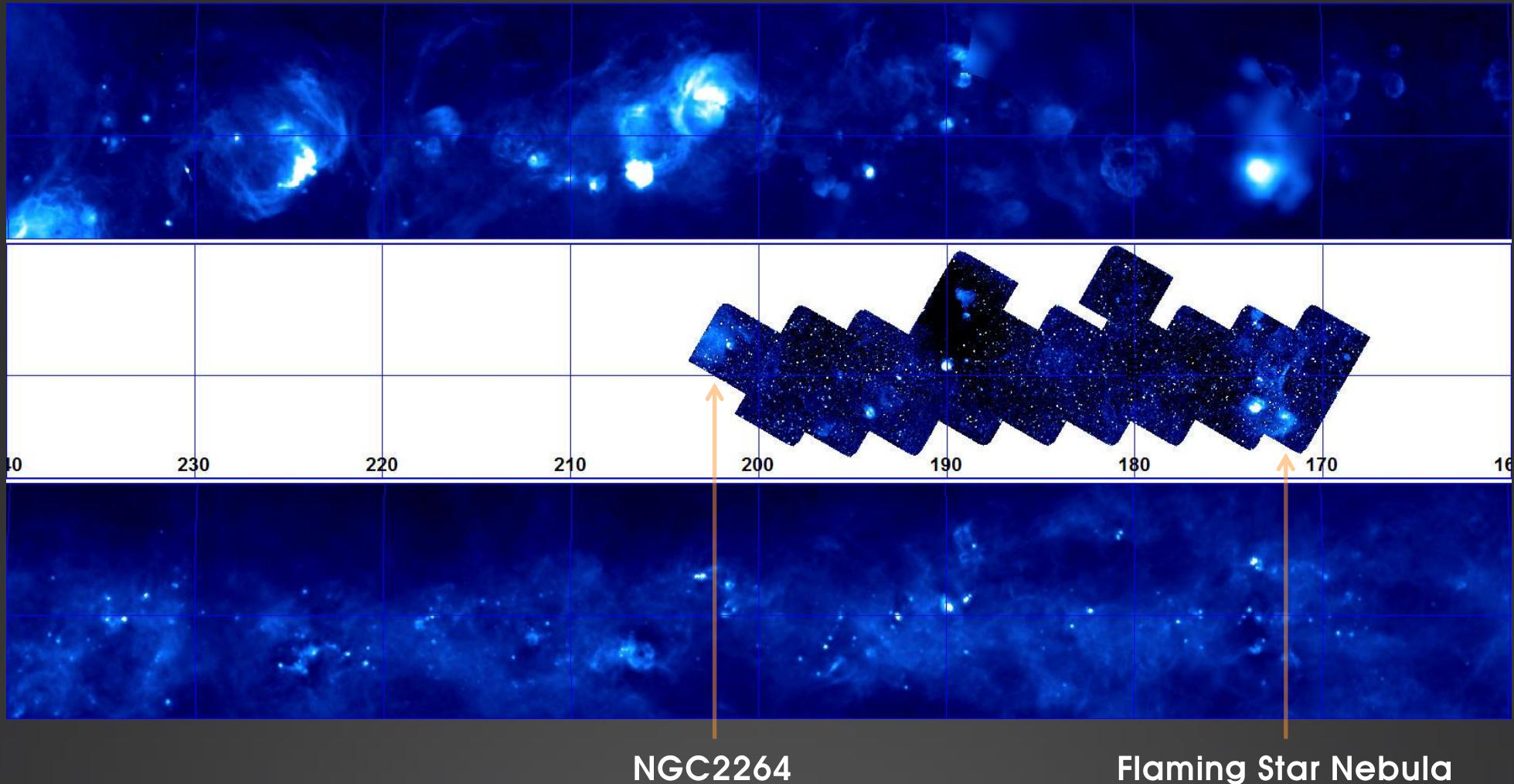
Preliminary Results

◆ $l = +170^\circ$ to $+230^\circ$

Top : H α image (Finkbeiner, 2003)

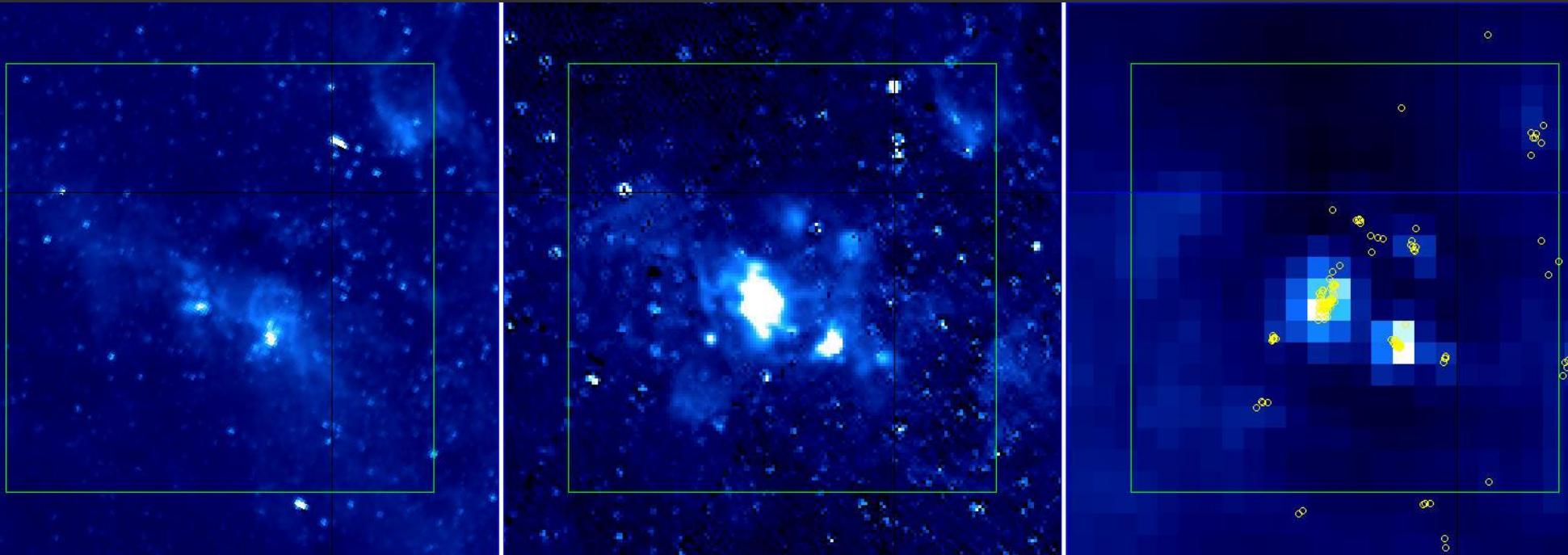
Middle : MIRIS Pa α image

Bottom : SFD E(B-V) dust image (Schlegel et al. 1998)



Preliminary Results

- ◆ RCW 57 region ($2^{\circ} \times 2^{\circ}$ area)



SHASSA H α image

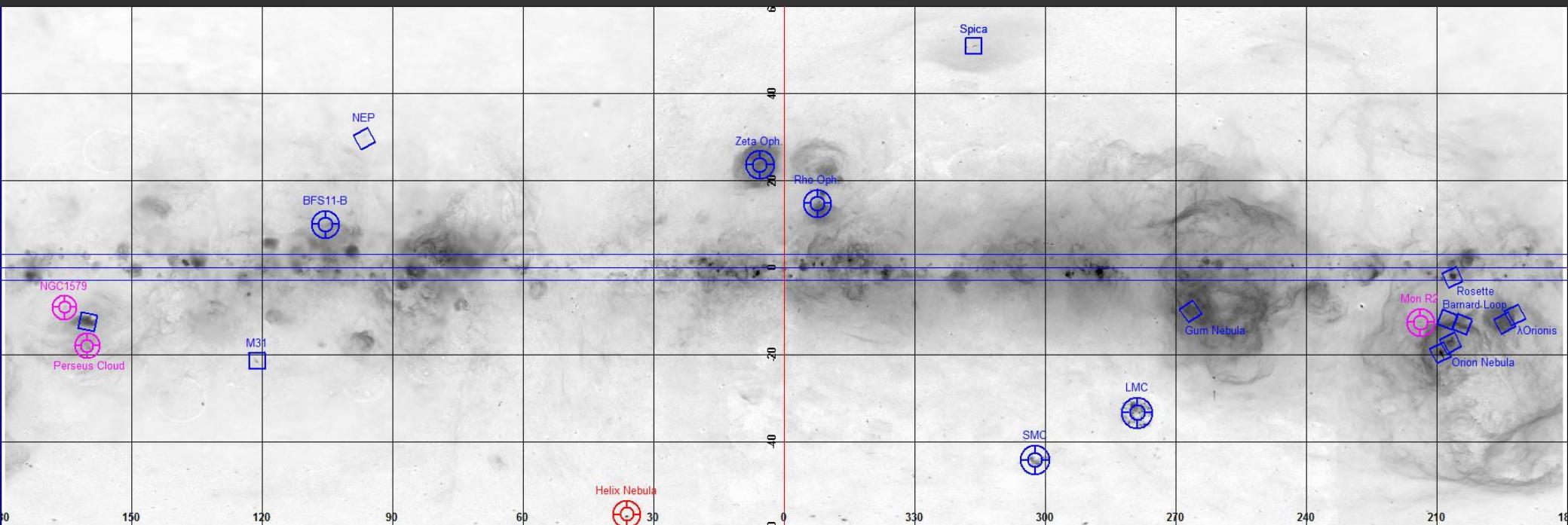
MIRIS Pa α image

SFD E(B-V) dust image
(with star-forming regions)

Pa α Pointing Observations

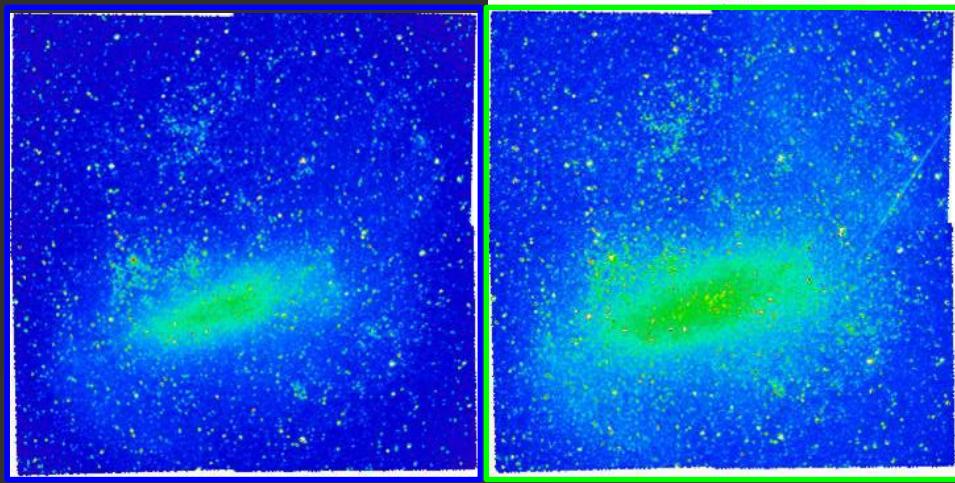
◆ Plan & Current Status

- Nearby H II regions on the Gould Belt : Orion, λ Orionis, IC434, Barnard Loop, Rosette, Gum, California, Zeta ophiuchi
- Star-forming Clouds : Rho ophiuchi, BFS11-B, Mon R2, NGC1579, Perseus cloud.
- Nearby Galaxies : M31, SMC, LMC
- Planetary Nebulae : Helix Nebula



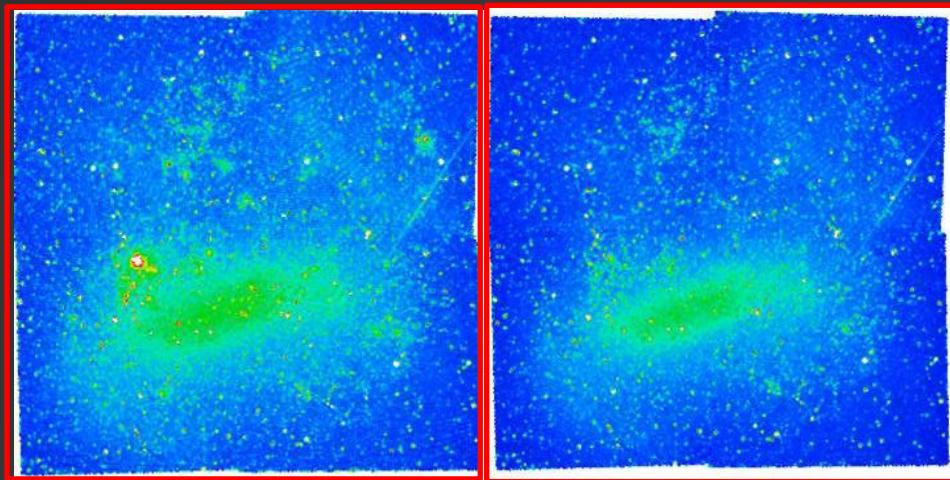
Pa α Pointing Observations

◆ Preliminary Results : LMC



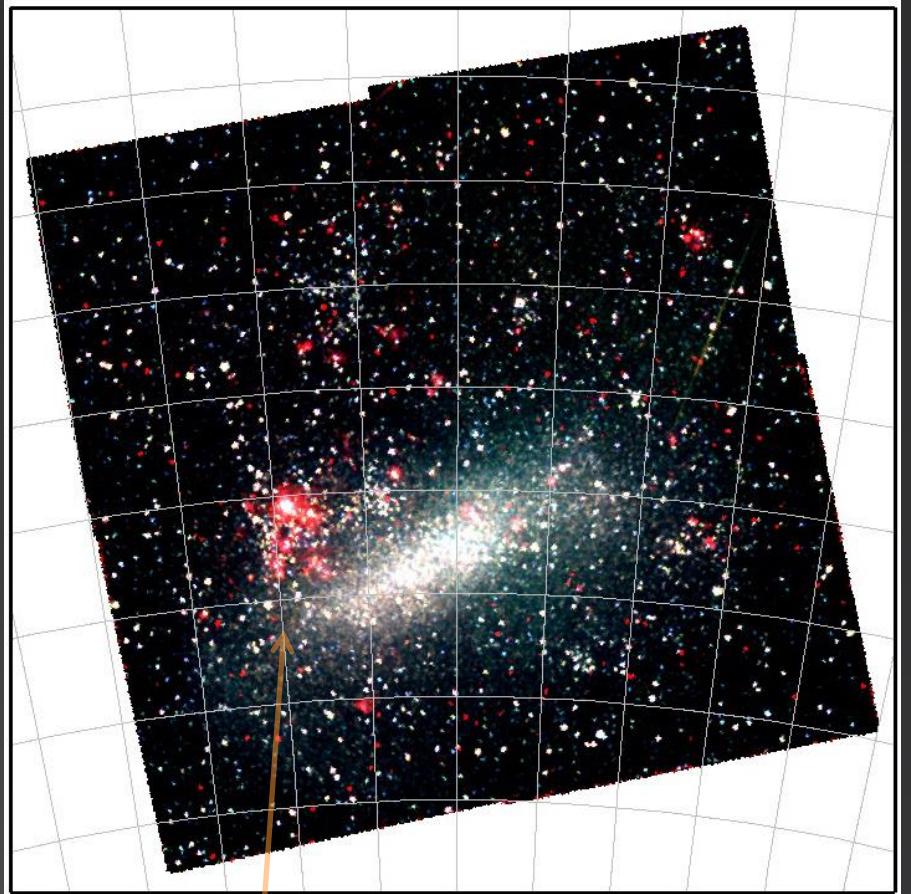
1.1 μm band filter

1.6 μm band filter



Pa α line filter

Pa α dual continuum filter



30 Doradus Nebula

RGB image By J. H. Pyo

Summary & Future Work

- ◆ Many of detected Pa α features are brighter than predicted by the H α observations (some of them are invisible in H α).
 - ◆ Bright Pa α blobs coincide well with dense cloud regions.
- Since Pa α recombination line suffers much less from dust attenuation than H α line, it can detect H II regions screened by clouds.
- Bright Pa α blobs seem to be from young massive star formation regions within clouds.
- ◆ Data reduction : removal of detector background, on-orbit flat field correction, flux calibration, re-estimate the scale factor of PAAL & PAAC (spatially variable).
 - ◆ Remove point sources and then complete diffuse Pa α emission line map.
- Catalog newly detected Pa α blob sources.
- Compare with Radio survey data (radio recombination line, radio continuum) as well as H α data, and then estimate foreground extinction and dust scattering effects.