

-ACES-

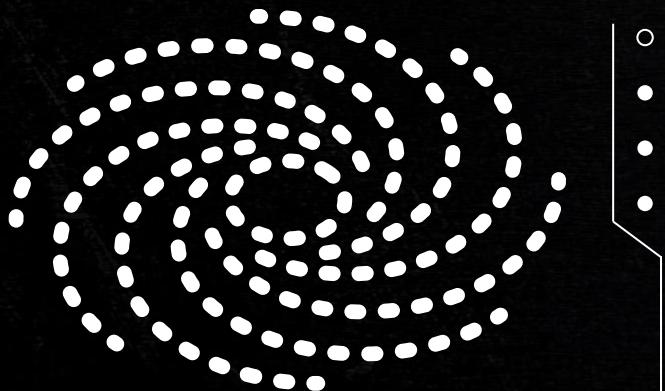
BOSTON



Savannah Gramze

PhD Student at the University of Florida

Advisor - Adam Ginsburg



Topics

Star Formation in the Dust Ridge

How does star formation progress as gas orbits the Galactic Center?



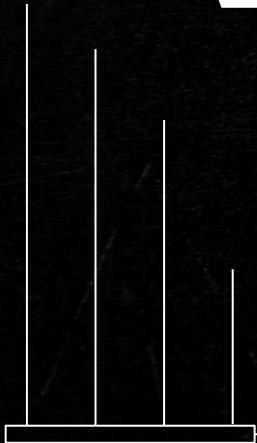
Line of Sight Confusion in ACES

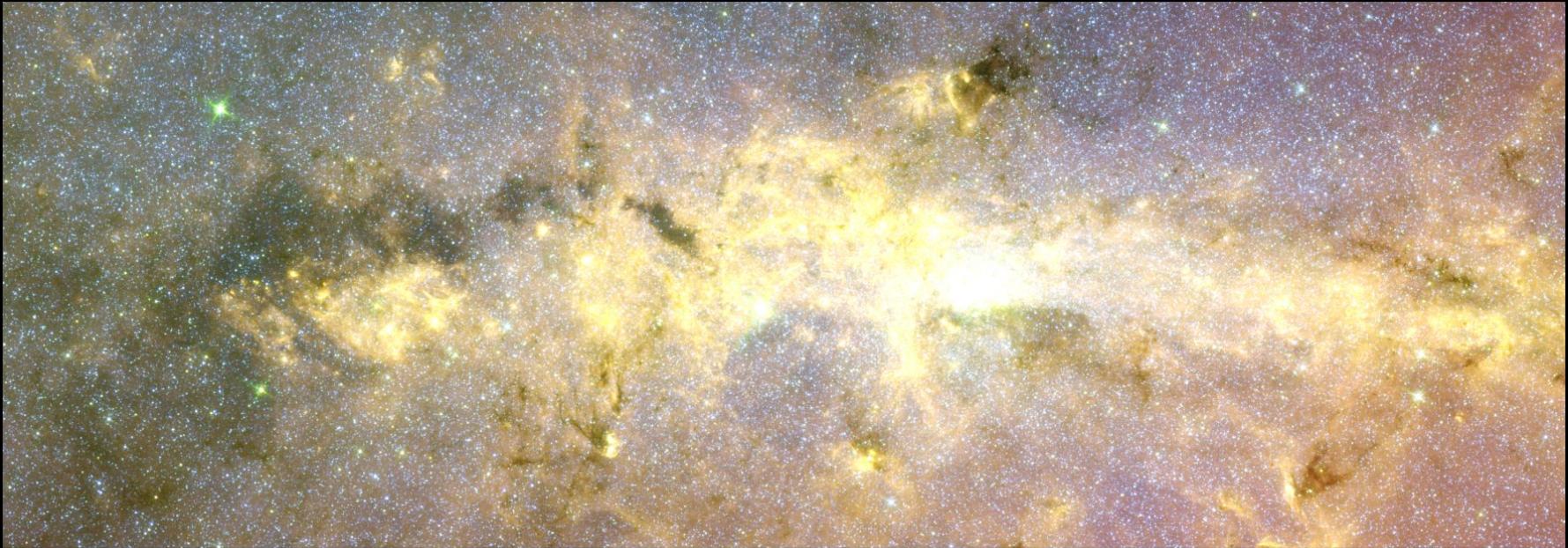


How much of the star formation and gas we see in ACES is not in the Galactic Center?



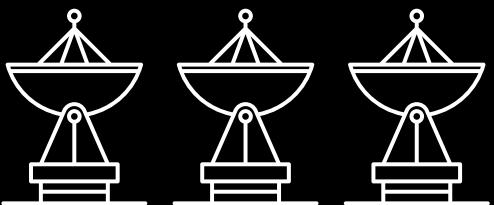
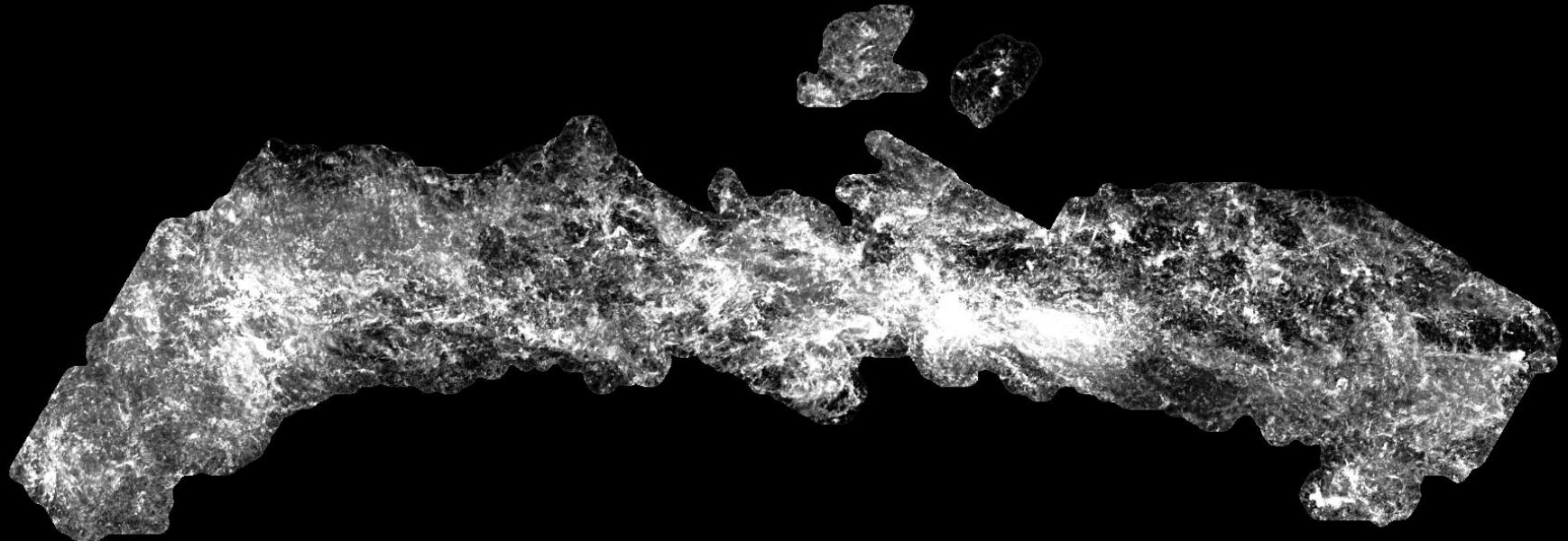
Let's Start with Some Data



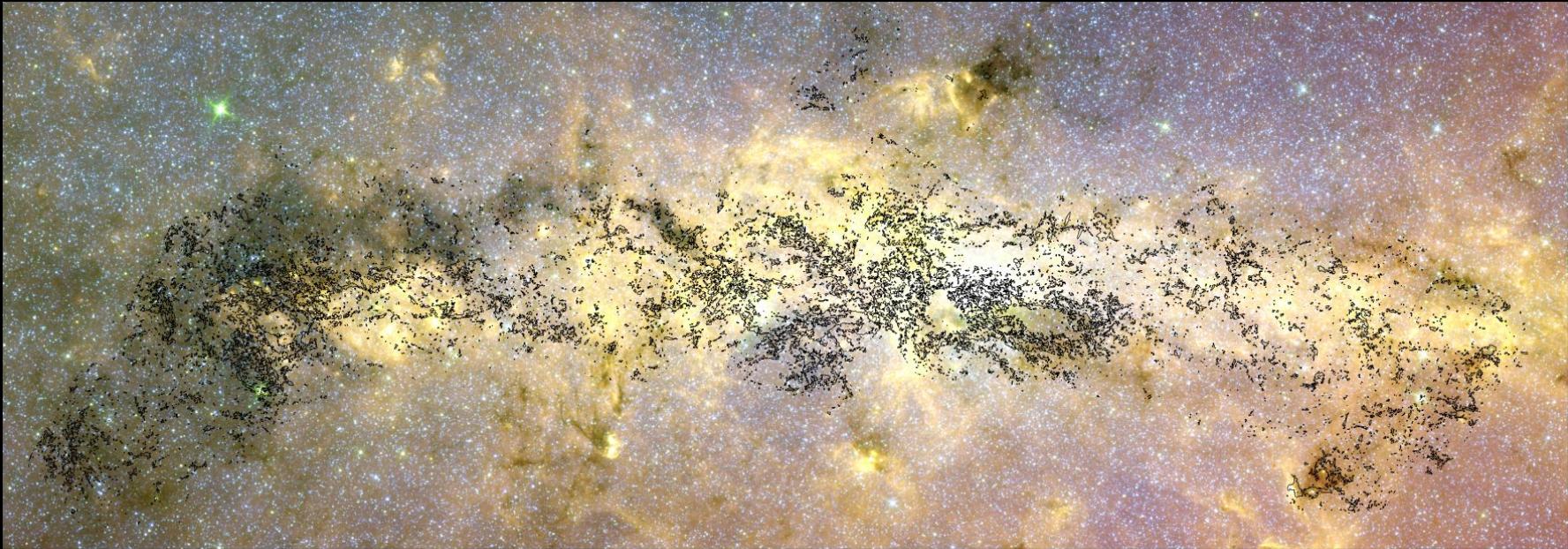


Galactic Center with Spitzer



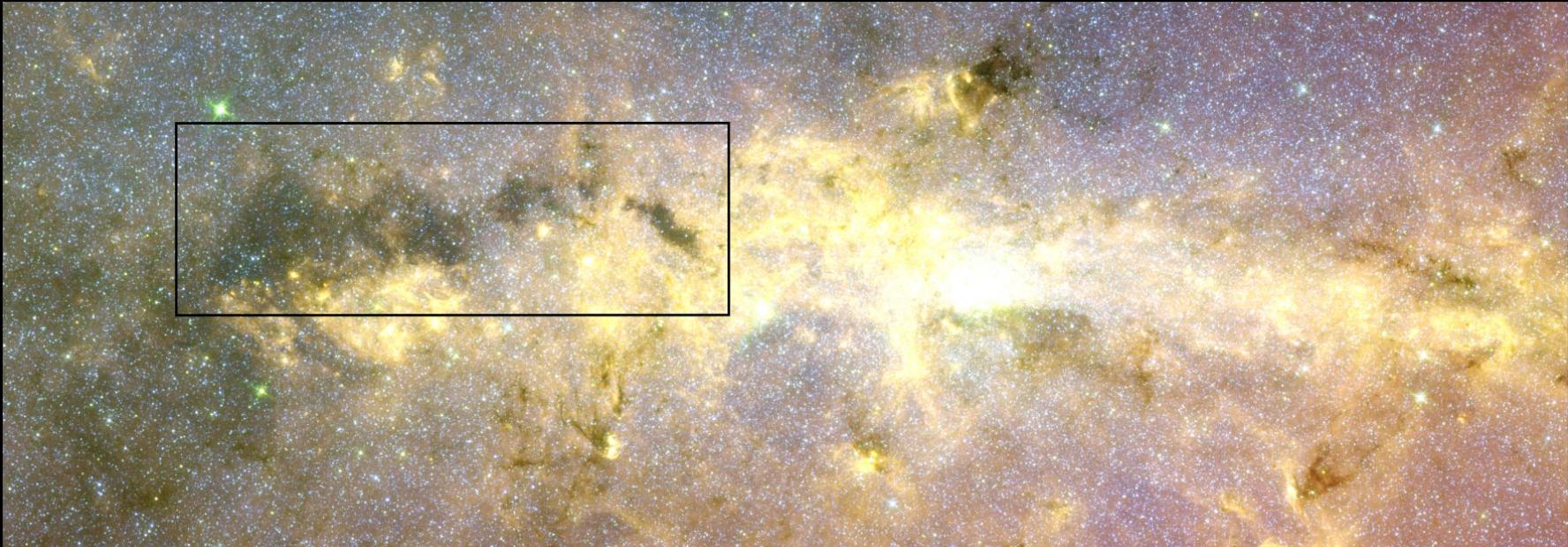


CS 2-1



Spitzer + CS 2-1





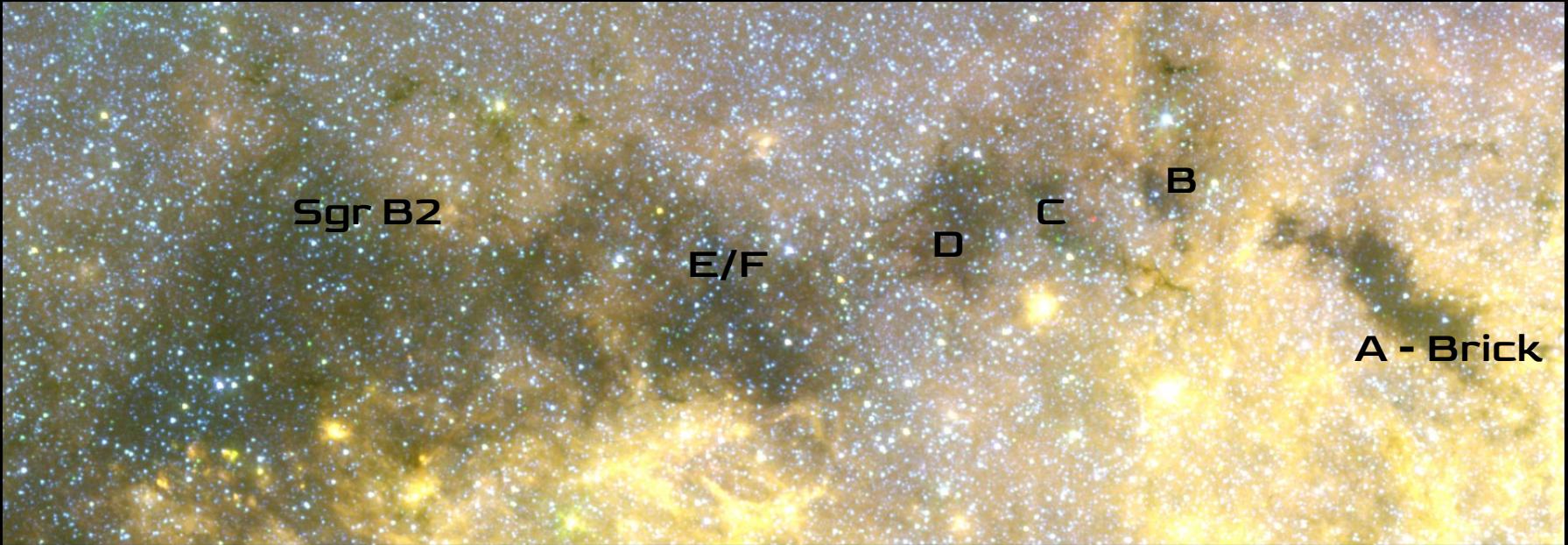
The Dust Ridge





The Dust Ridge





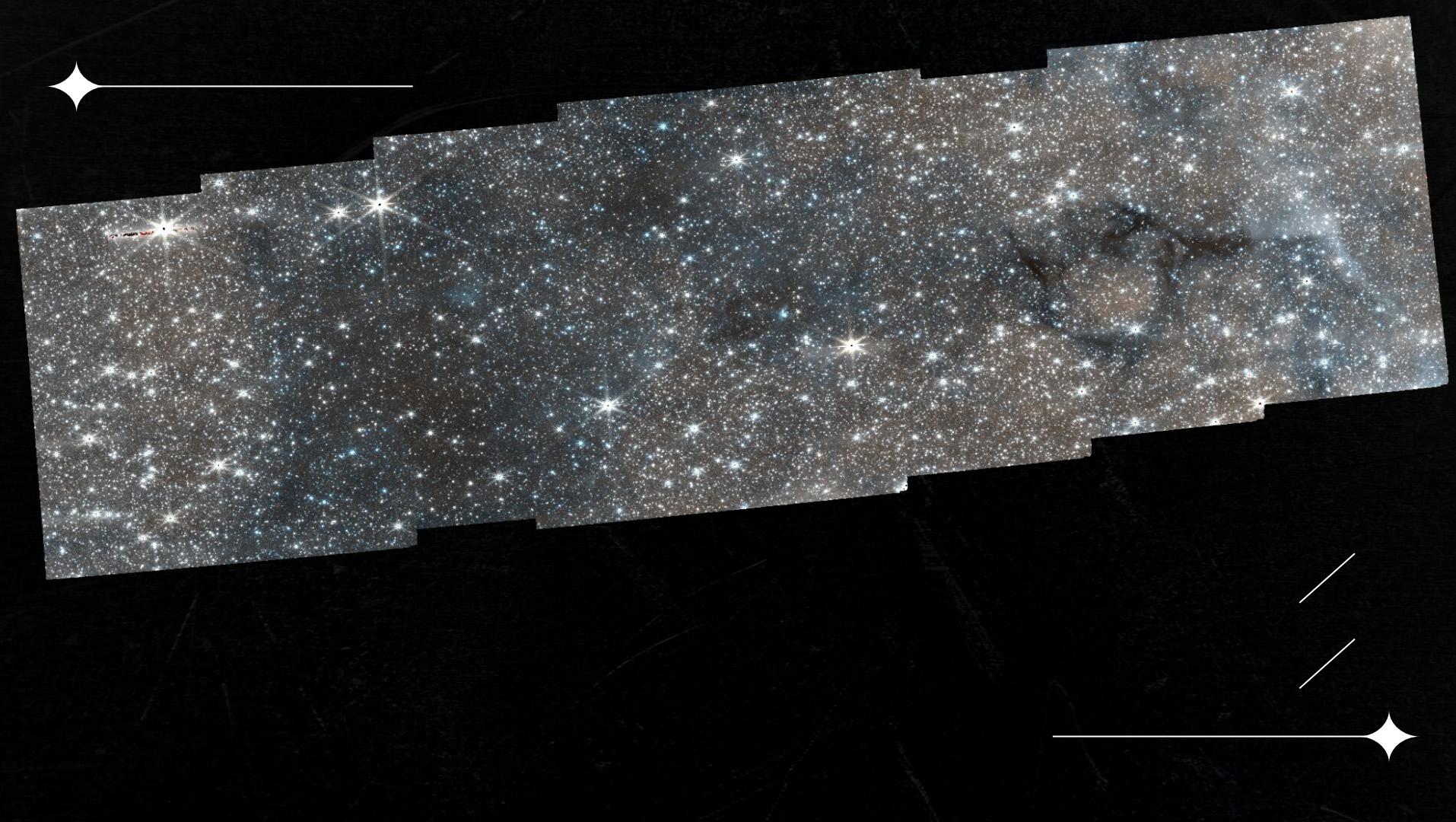
The Dust Ridge

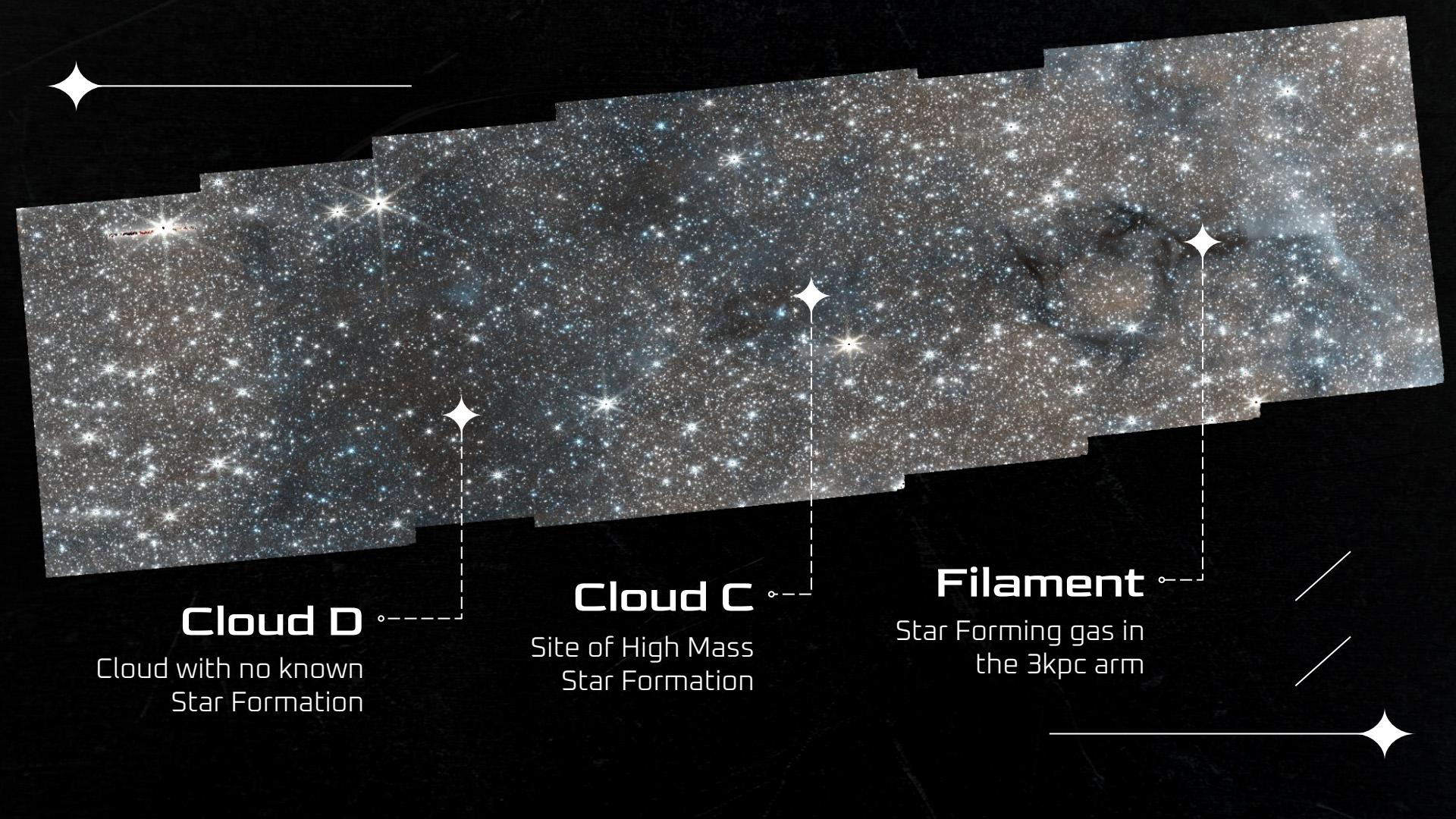




JWST NIRCam FOV







Cloud D

Cloud with no known
Star Formation

Cloud C

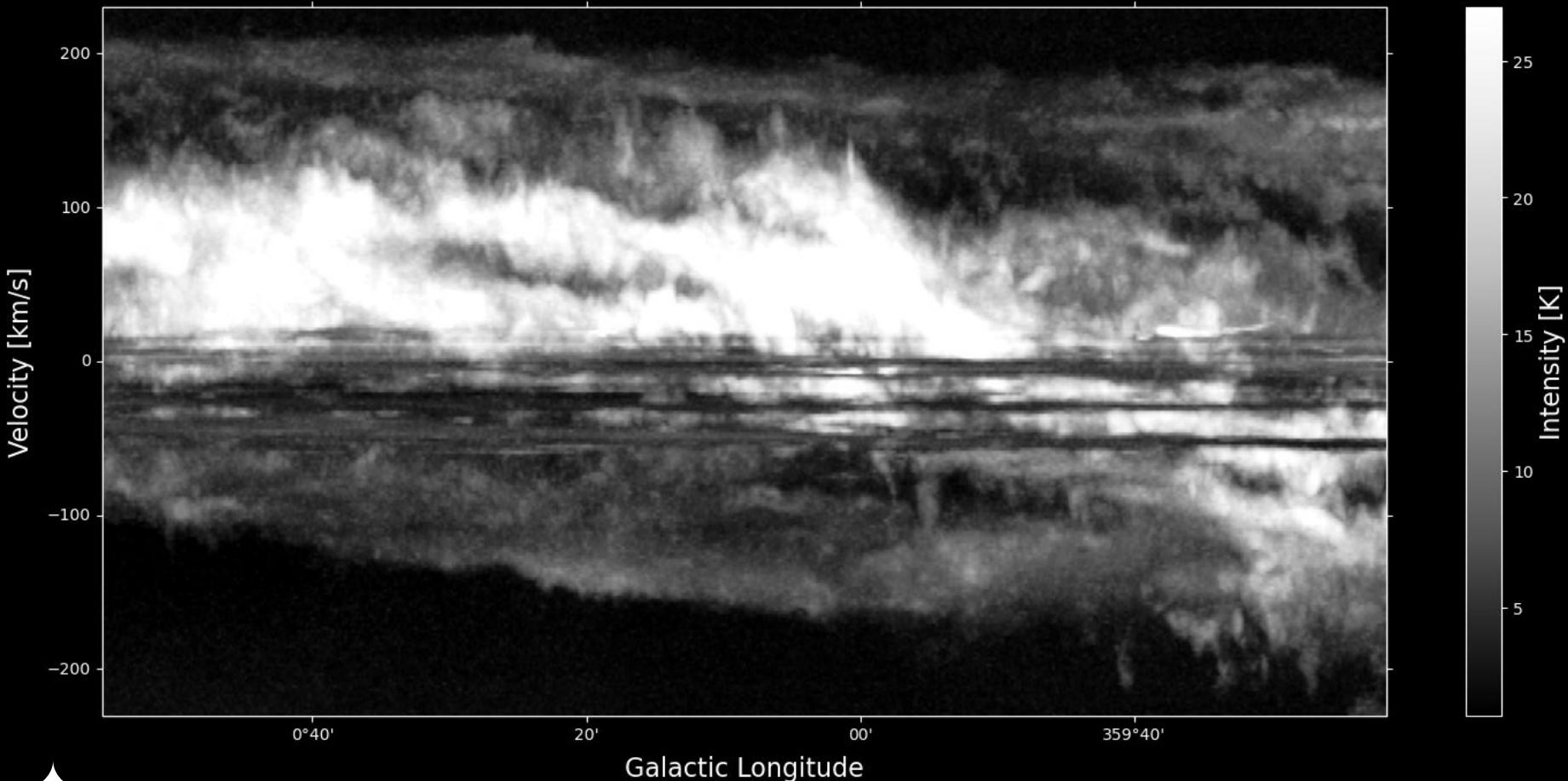
Site of High Mass
Star Formation

Filament

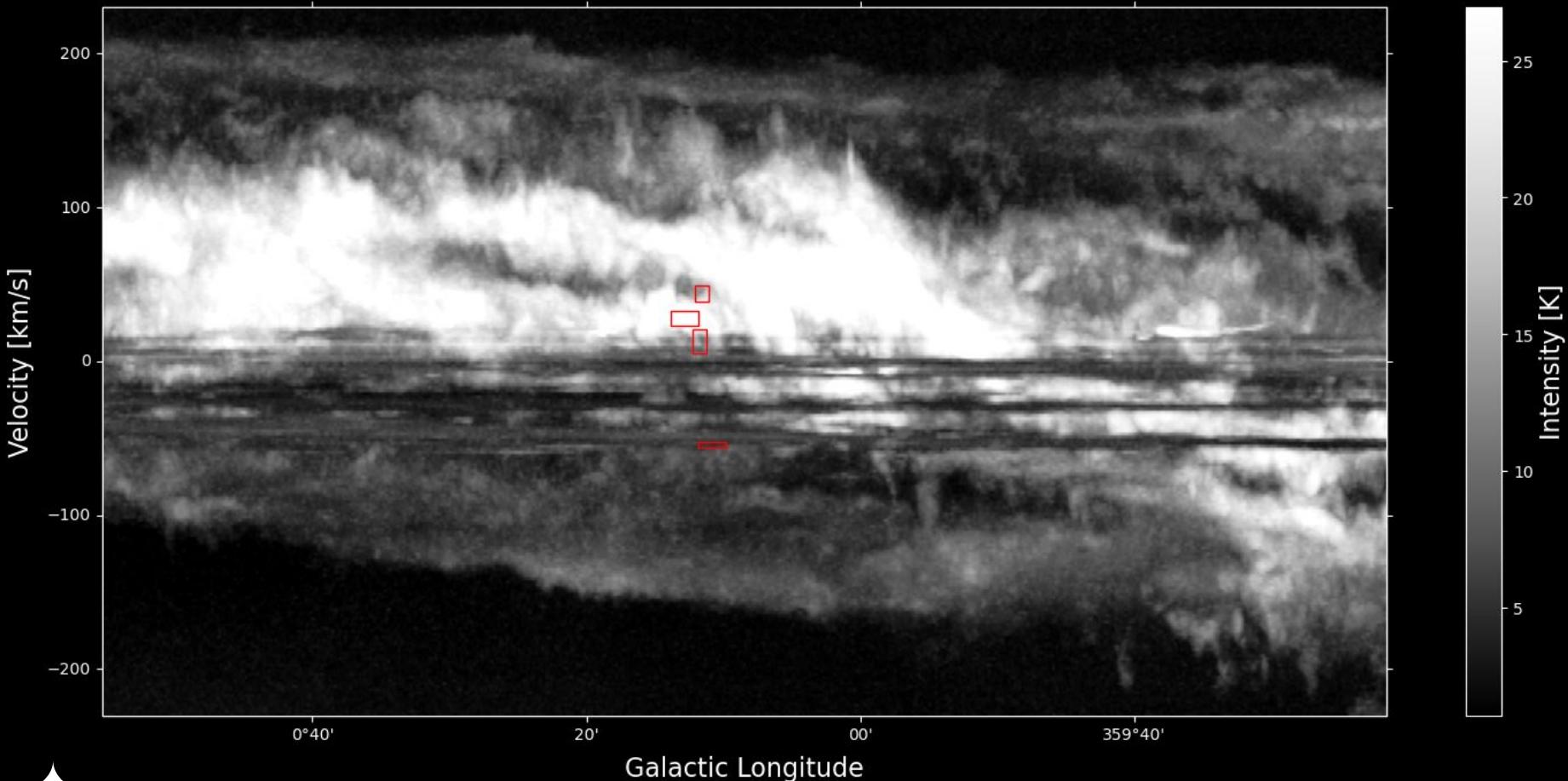
Star Forming gas in
the 3kpc arm

- Large scale context
- CS PV diagram ✓
 - Make rgb with CO? X
- ACES CS moment map ✓
- BEARS CO large scale mom0? - more for the filament ✓
- Where the dust ridge is in the CMZ and where I'm pointing ✓
- Spitzer to show where the dust ridge is ✓
- Have every ACES molecule as an overlay as backup slides ✓
 - Mom0 maps
 - Pv diagrams
- SiO masers and Webb sources
 - Show MIRI+NIRCam images with SiO maser catalog overlaid, confirm they are all stars
- Lots of backup slides!!

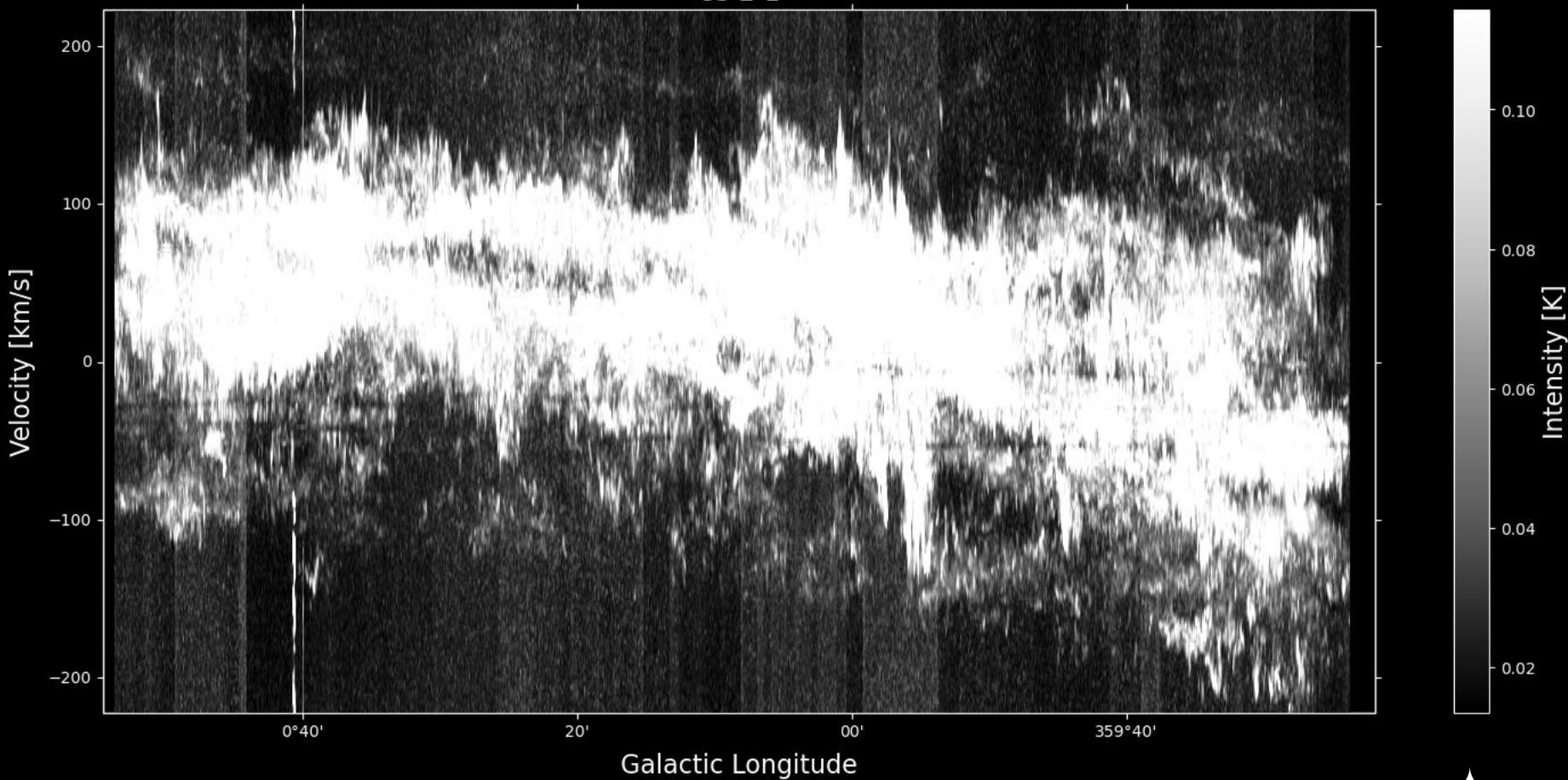
^{12}CO 1-0



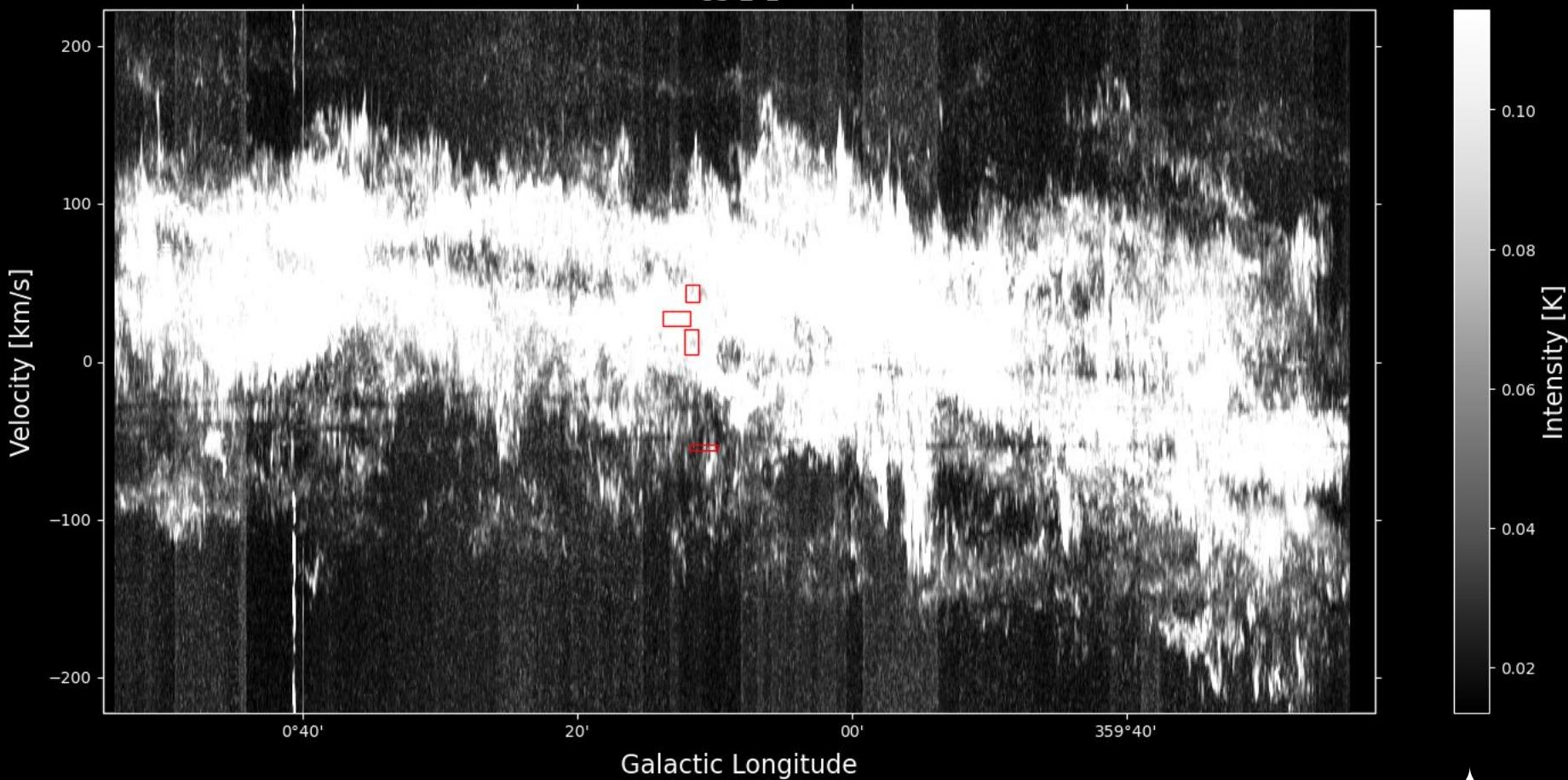
^{12}CO 1-0



CS 2-1



CS 2-1



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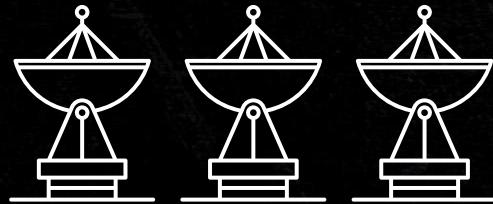
Dust Ridge Cloud D

Star Forming Status: None
(known)



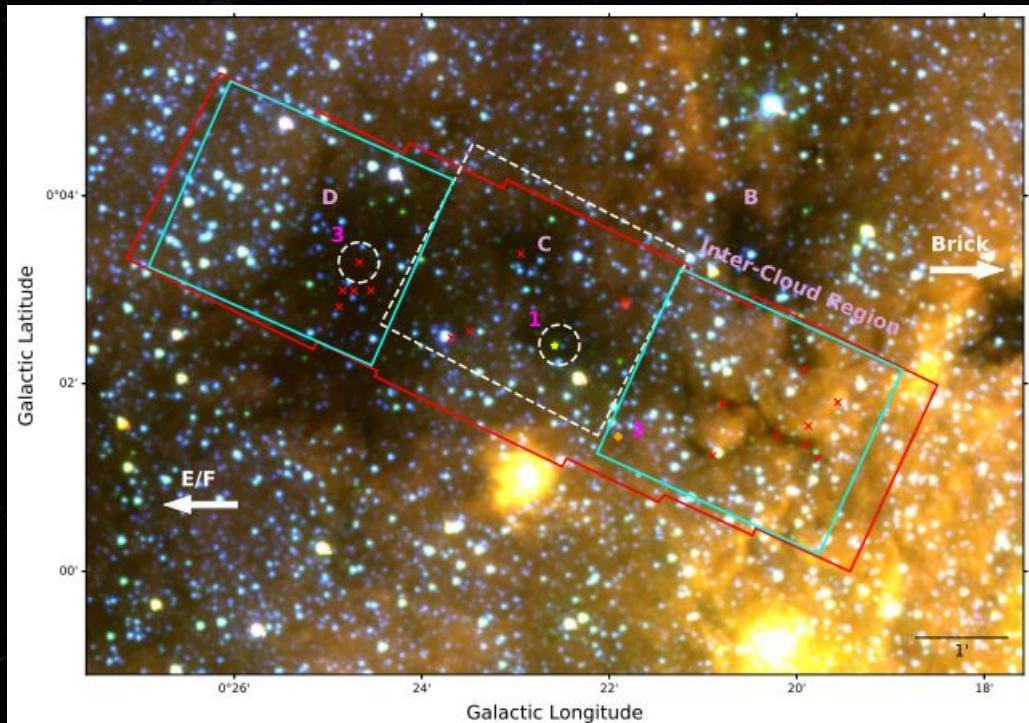
Data Pending...

- ★ ALMA Proposal covering Cloud D in Band 6 was accepted with C rank!
- ★ Goal: Search for signs of low mass star formation in Cloud D and Inter-Cloud Region



Data Pending...

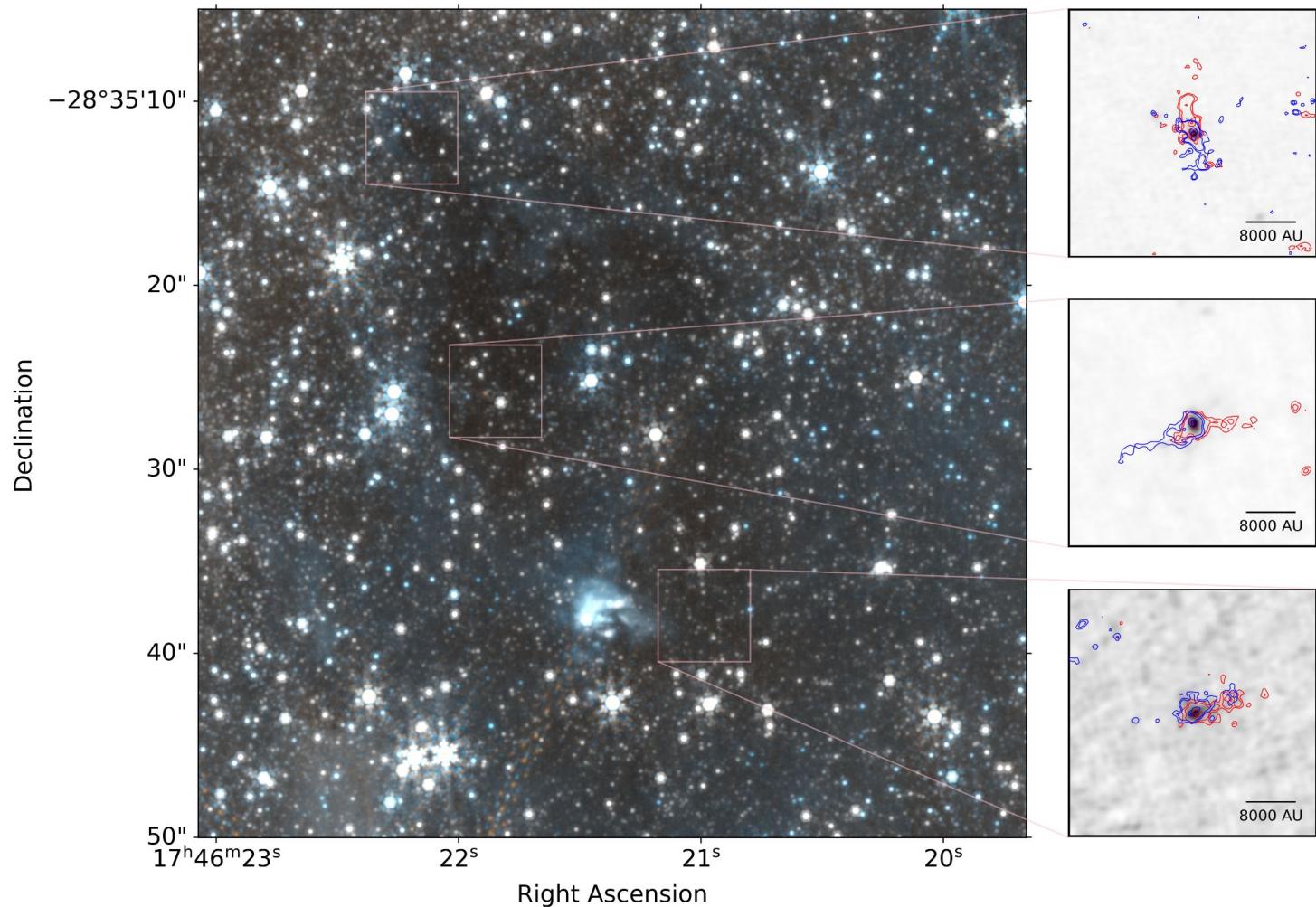
- ★ ALMA Proposal covering Cloud D in Band 6 was accepted with C rank!
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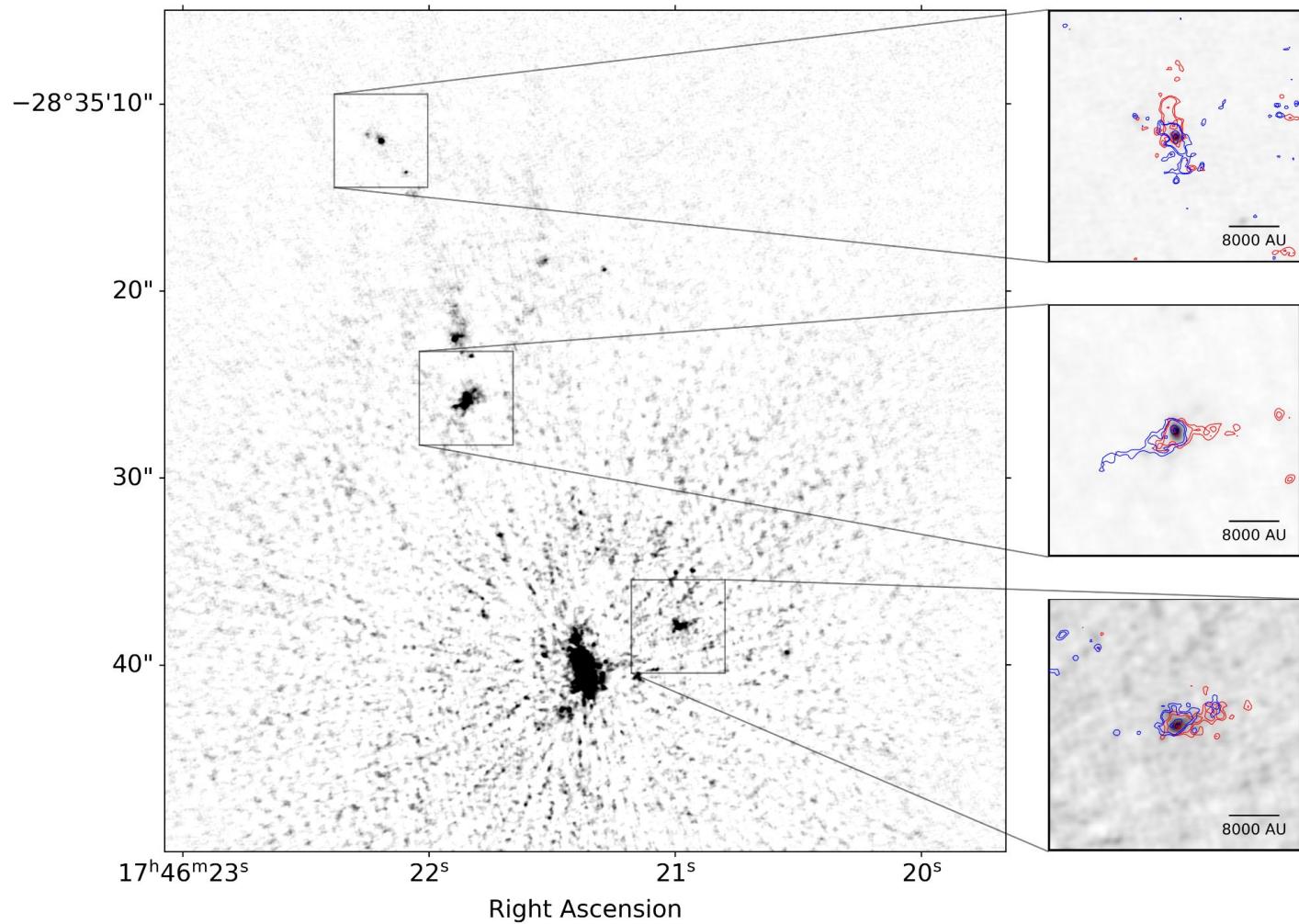


Dust Ridge Cloud C

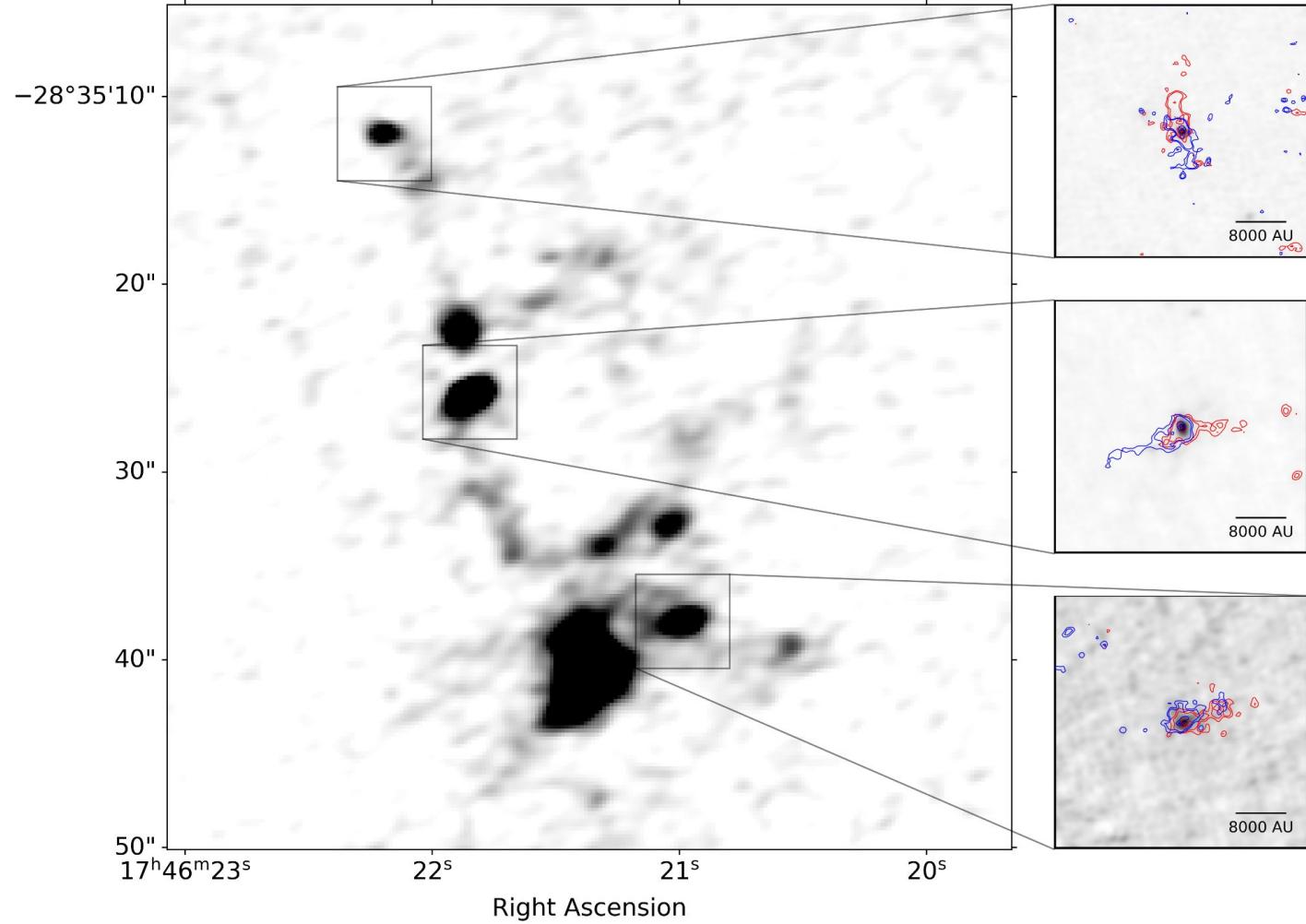
Star Forming Status: Massive
Components: Two



Declination

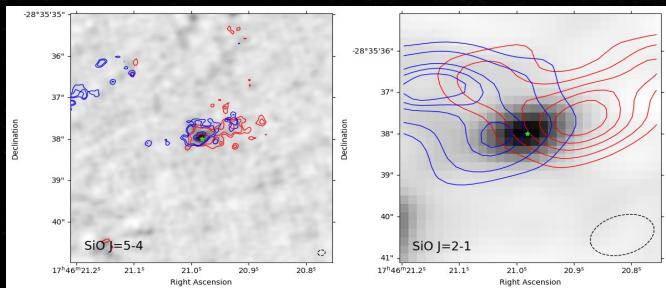
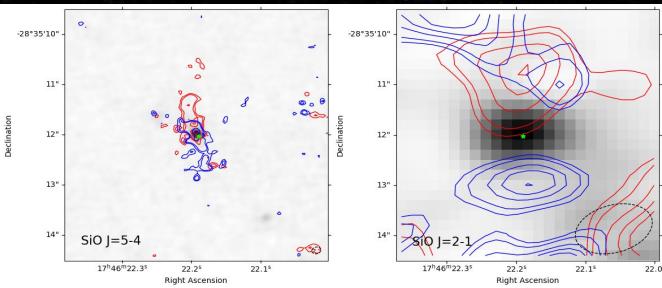
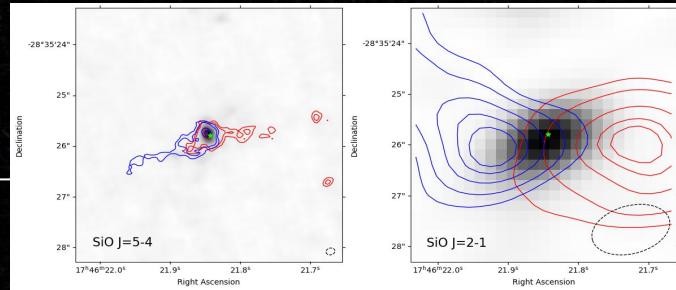


Declination



Cloud C Outflows

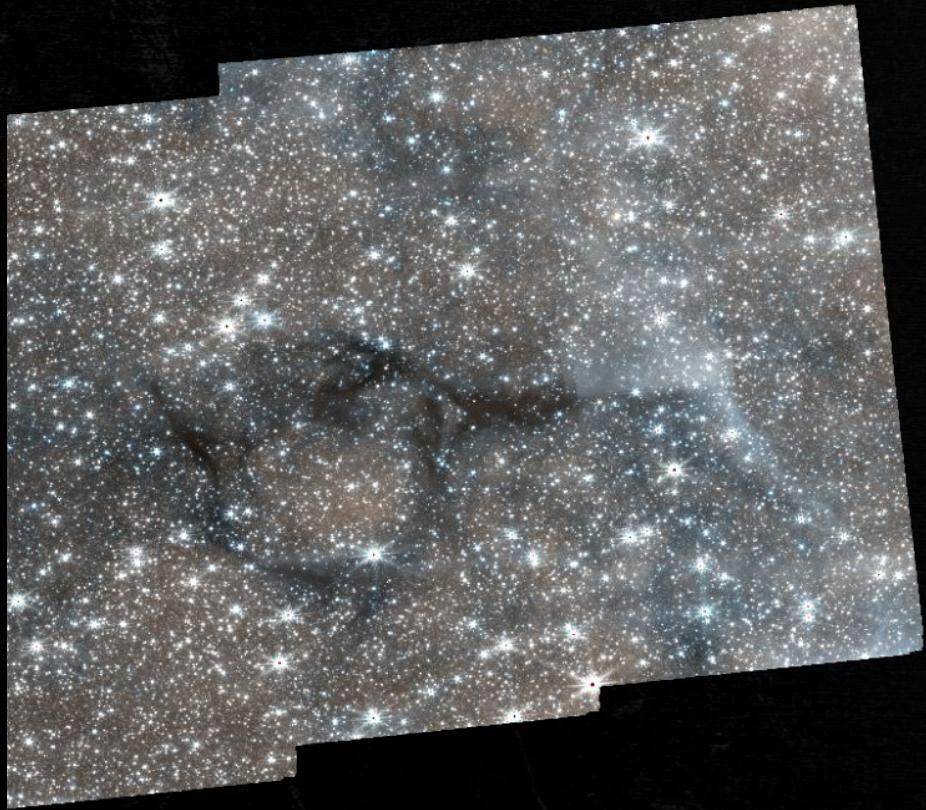
- ★ ACES has several lines which act as outflow tracers
- ★ We can see correlations between ACES outflow traces and outflow features in more resolved data.



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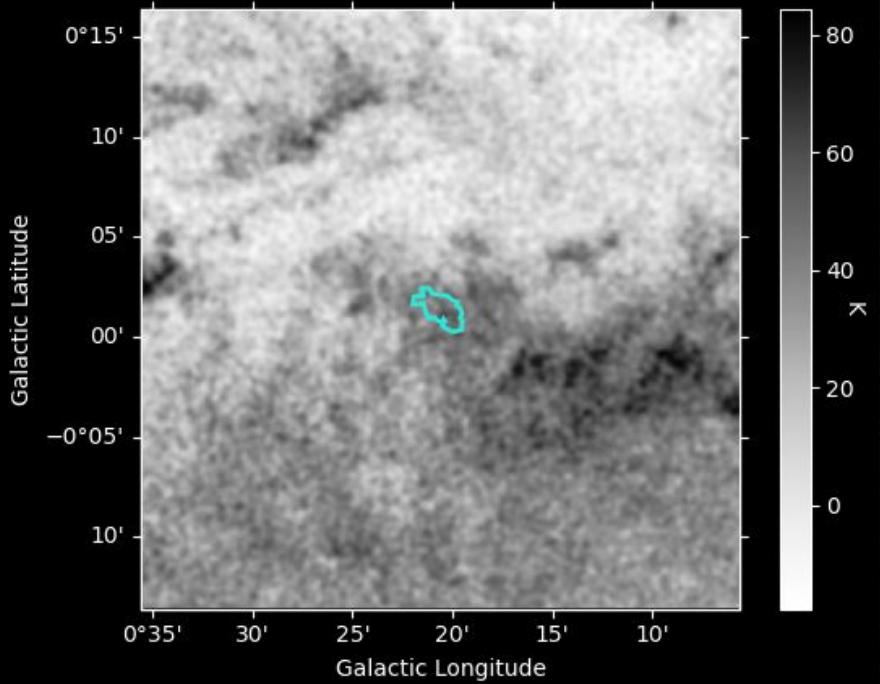
Star-Forming Filament

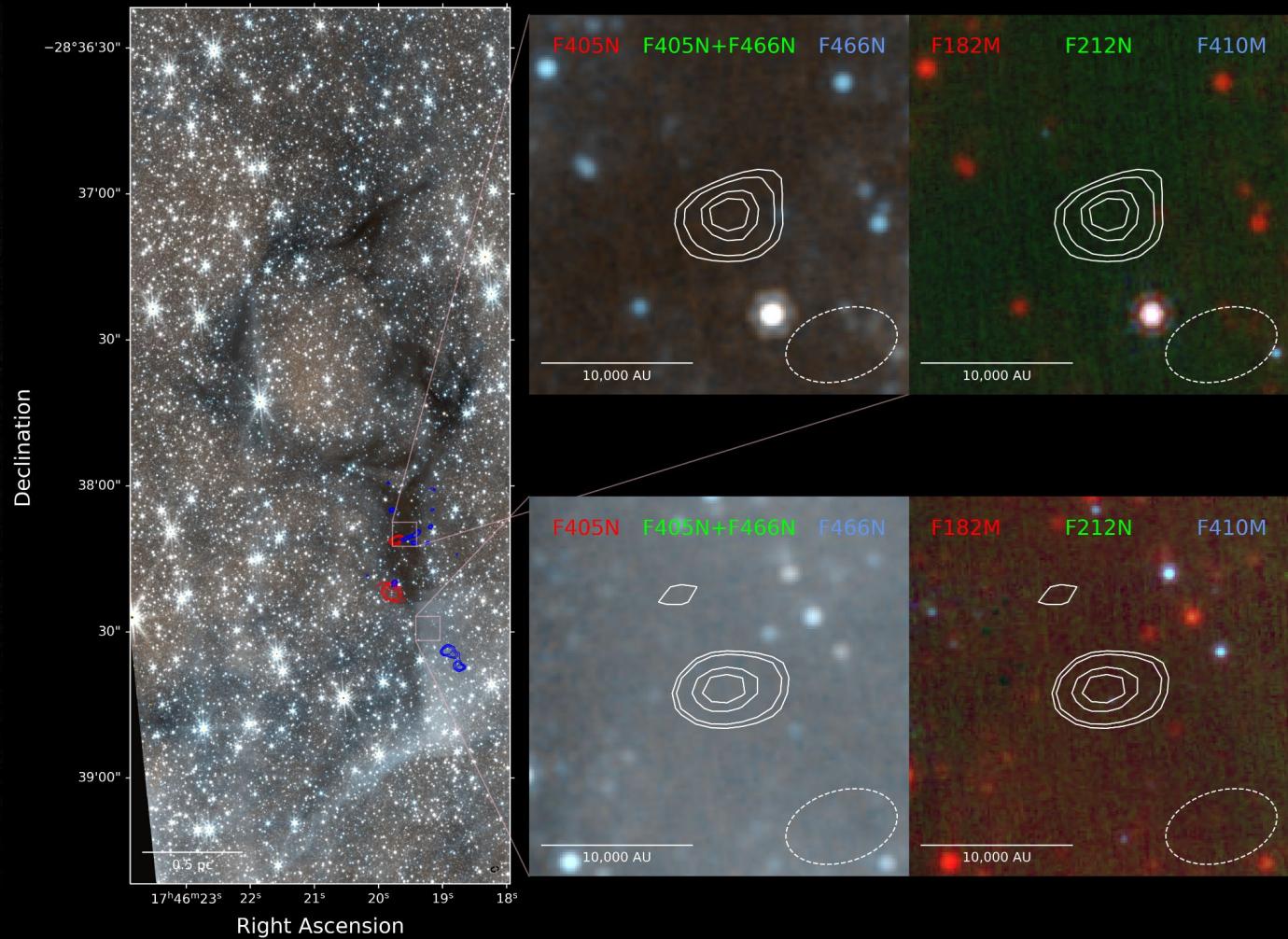
Location: 3kpc arm
Outflows: Two



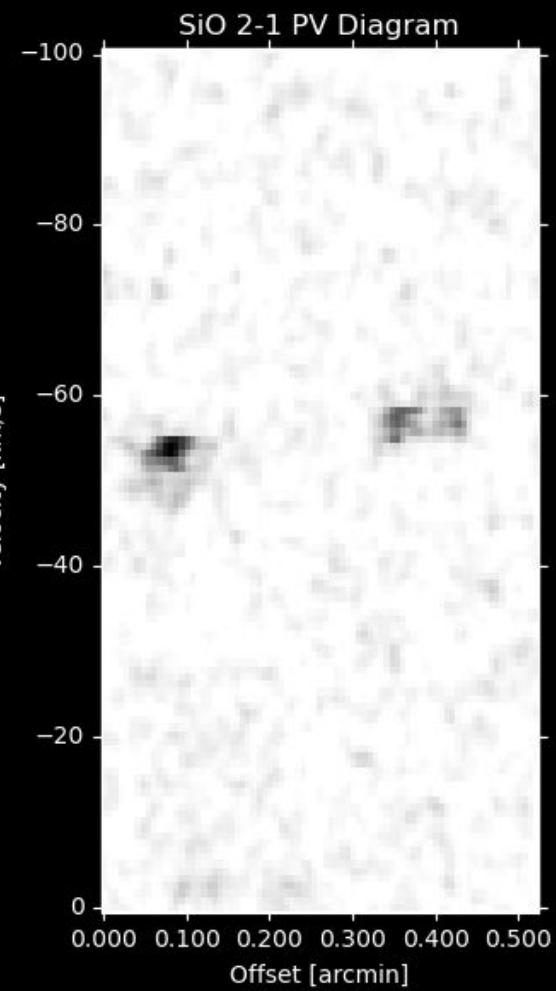
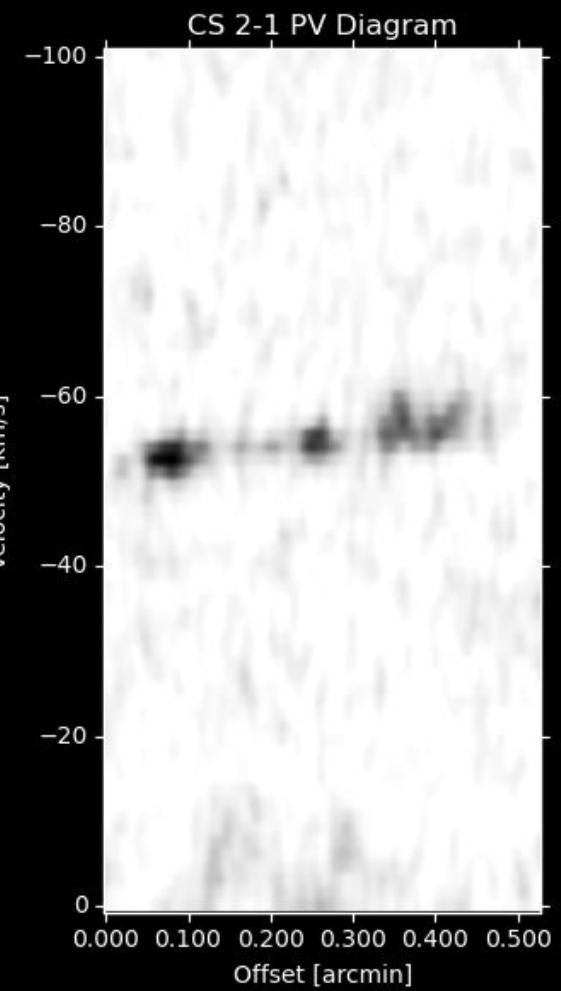
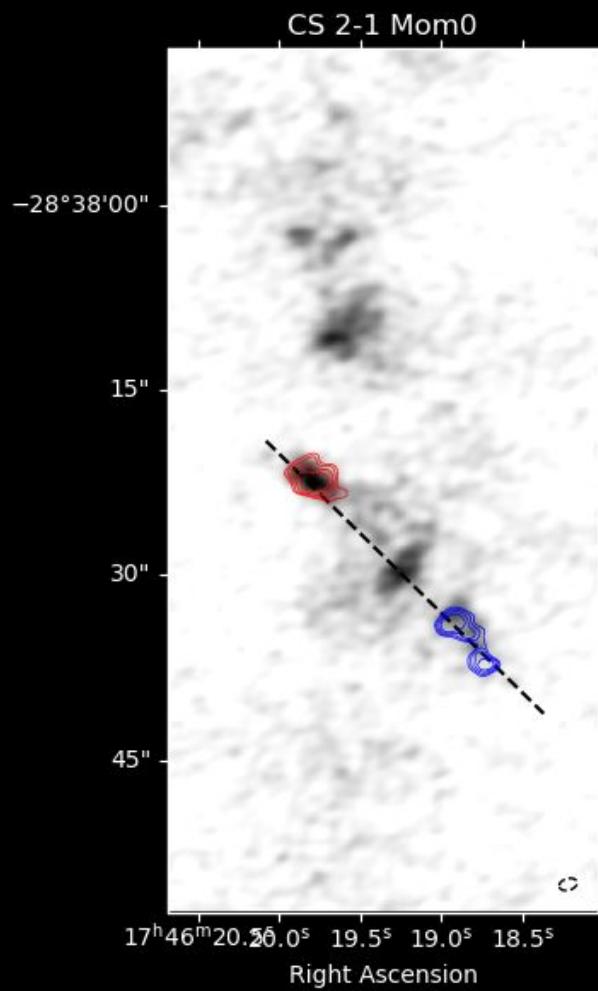
Star-Forming Filament

- ★ Embedded in a larger cloud of CO
- ★ ^{12}CO does not trace the filament structure
- ★ Two protostellar cores identified with ACES data
 - Continuum
 - And outflows!
- ★ Located in the 3kpc arm
- ★ How much star formation in ACES is located outside of the CMZ?



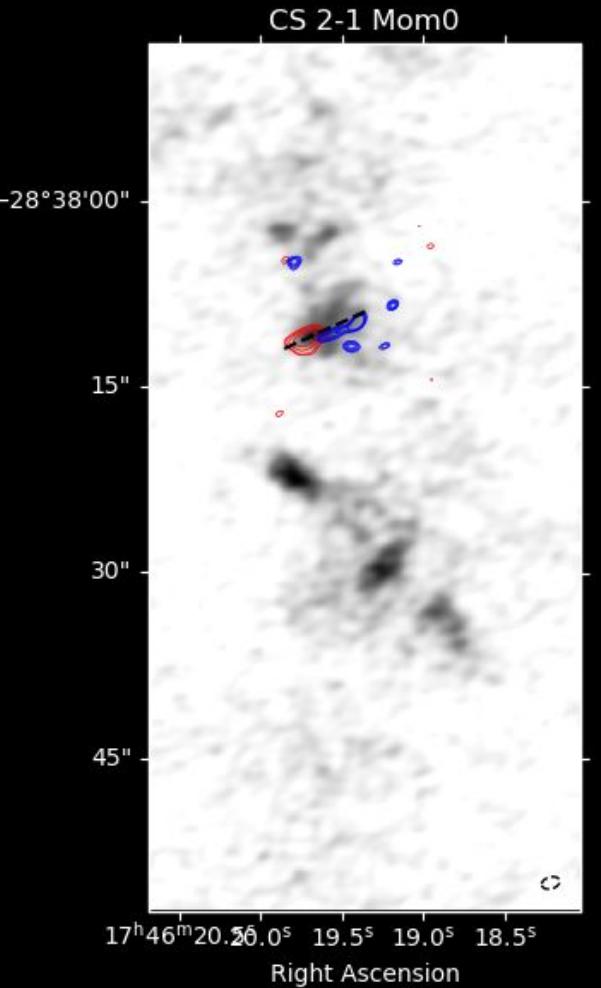


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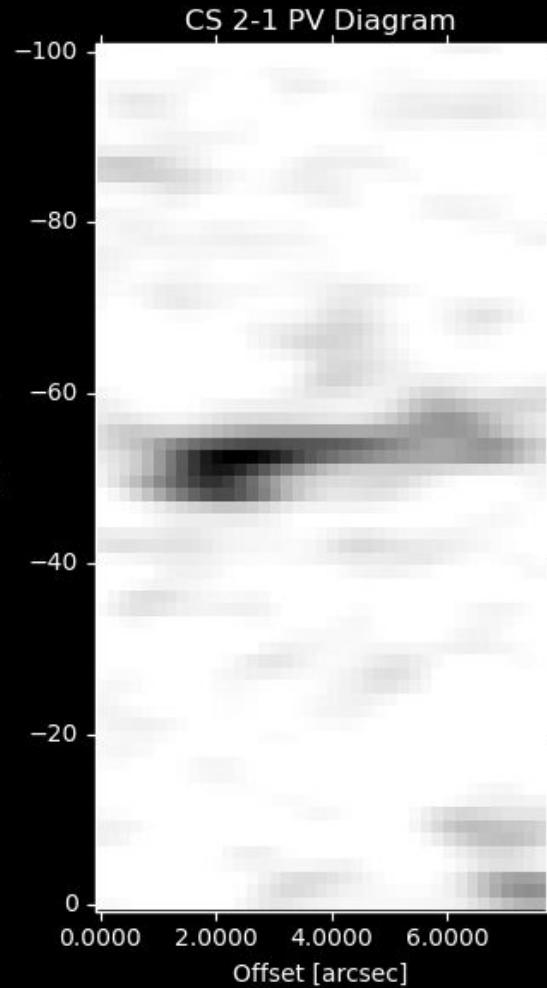


Declination

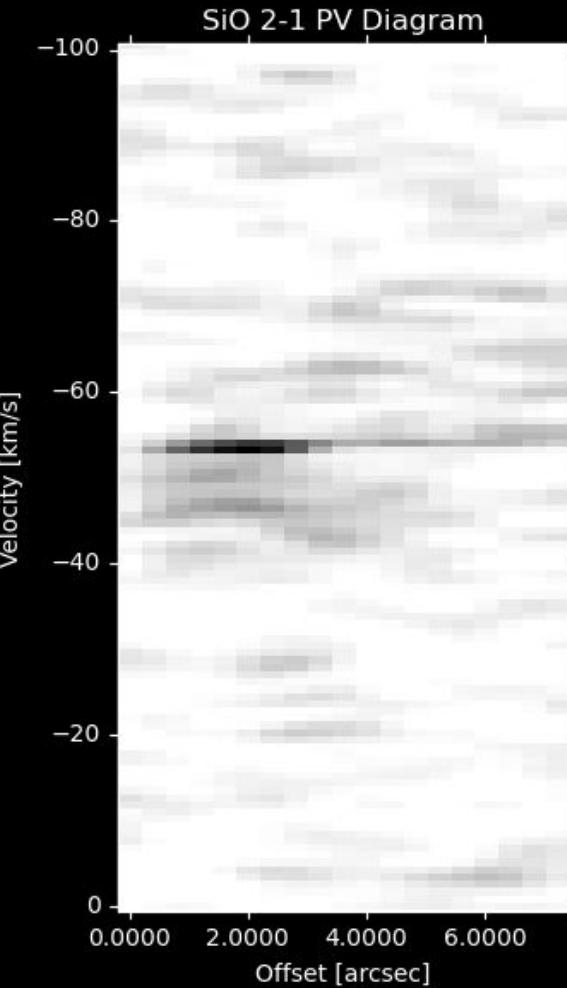
CS 2-1 Mom0

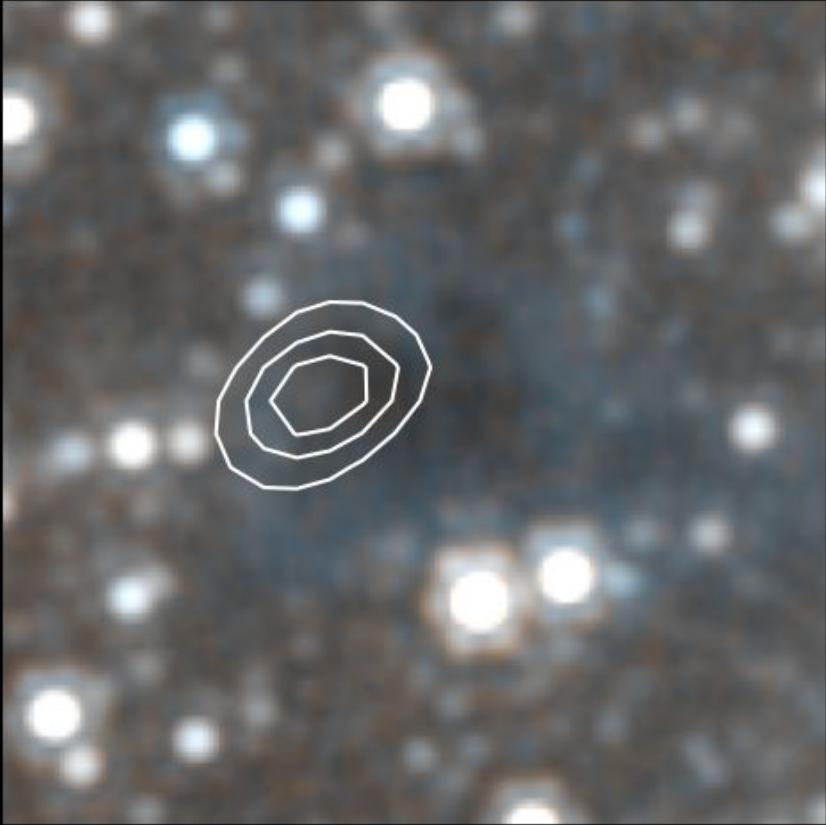


CS 2-1 PV Diagram



SiO 2-1 PV Diagram



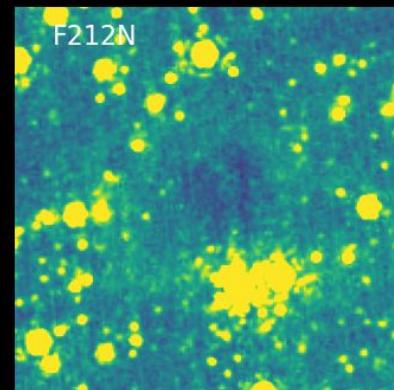
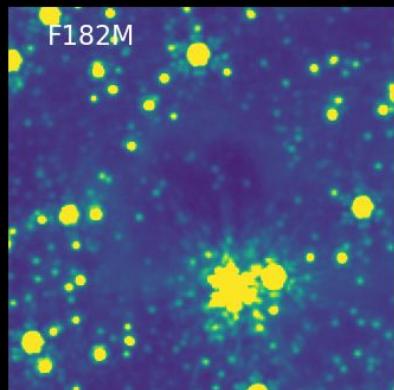
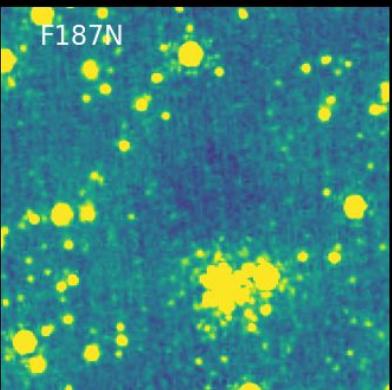
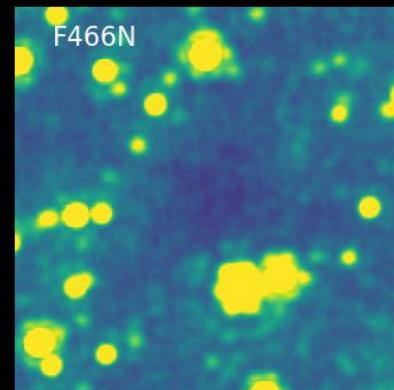
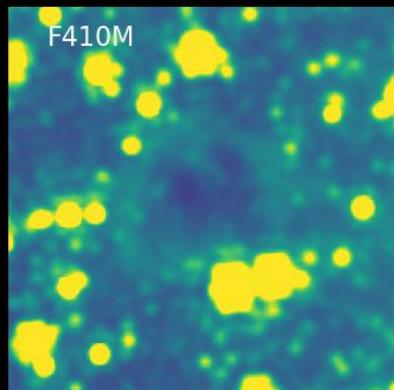
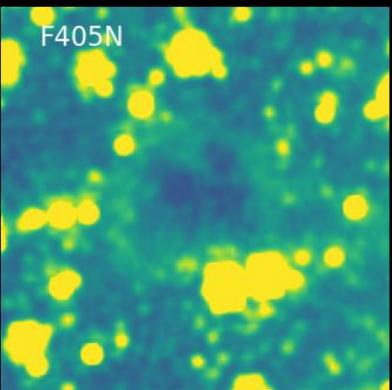


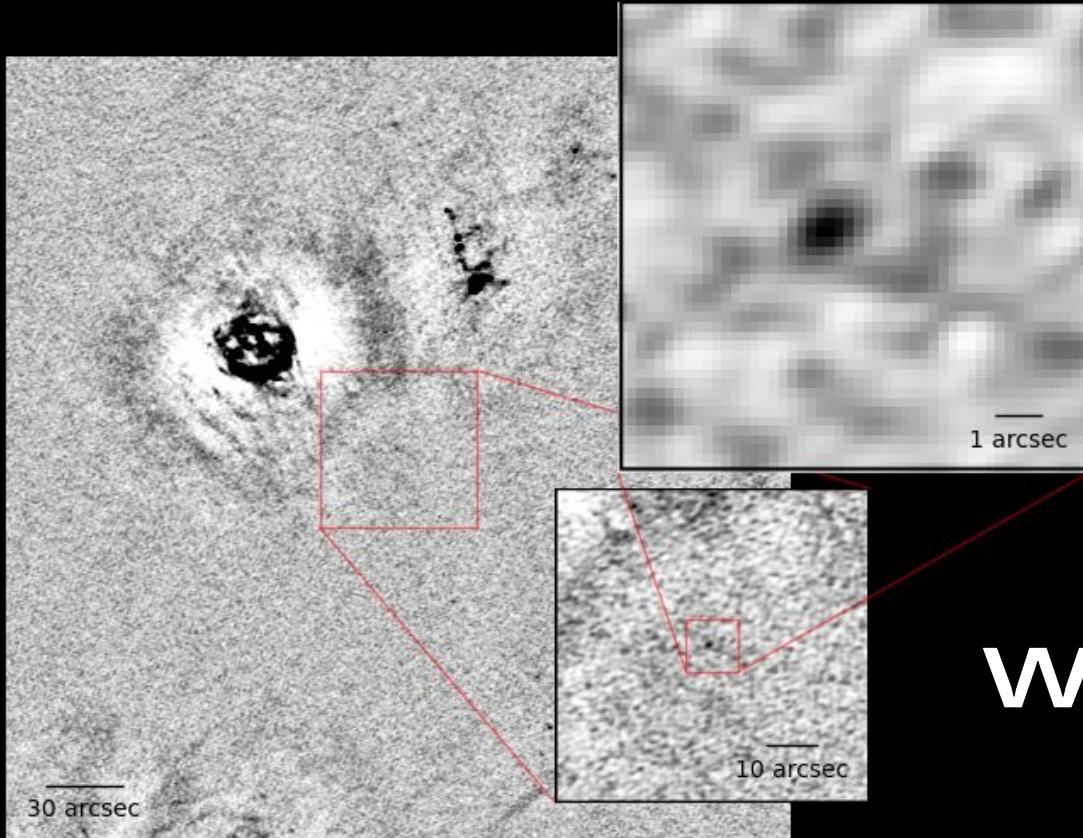
The Smudge

Location: Galactic Center?
Spectral Index: Dusty 3.75
Mass: $\sim 10 M_{\odot}$
Status: Pre-stellar Core

The Smudge

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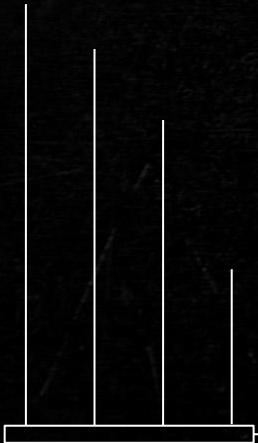


Is the Smudge in the
Galactic Center?
Line of sight velocity:
33 km/s

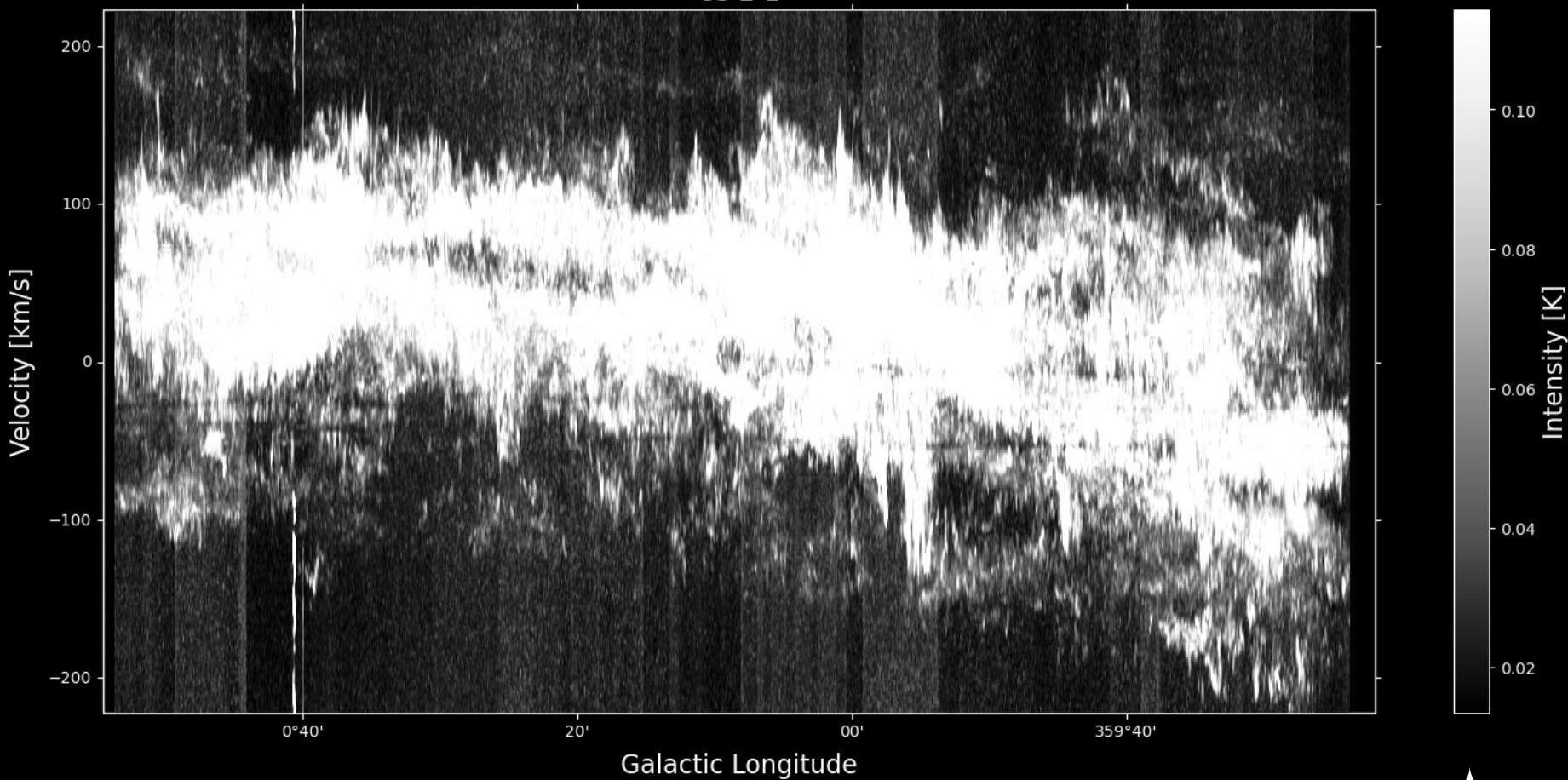
**Where is the
Smudge?**

$\text{SiO } 2-1 \nu=1$

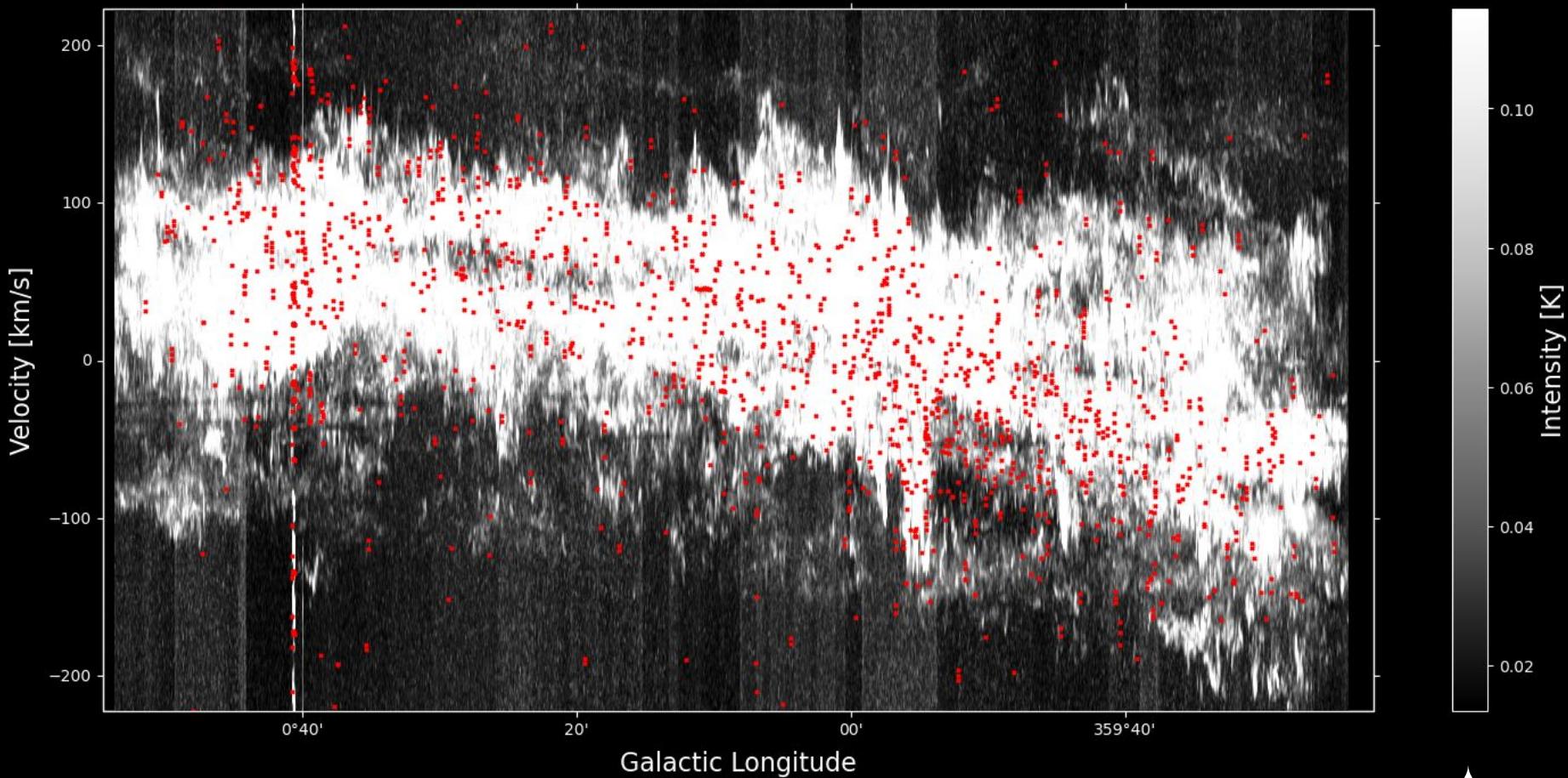
Masers

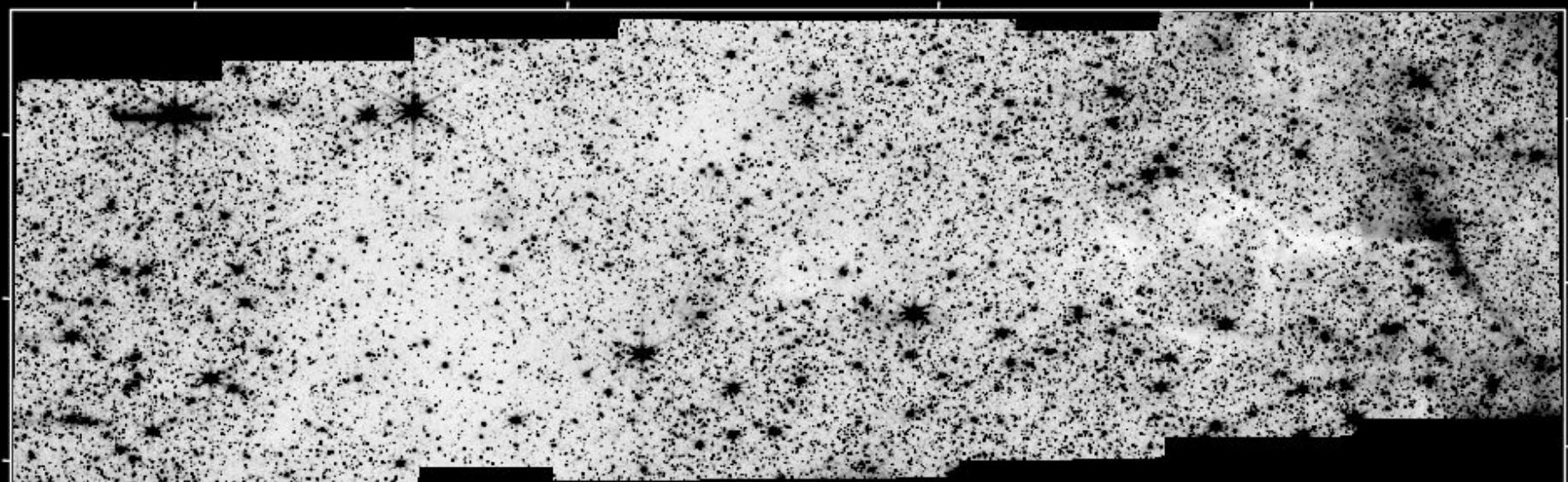


CS 2-1



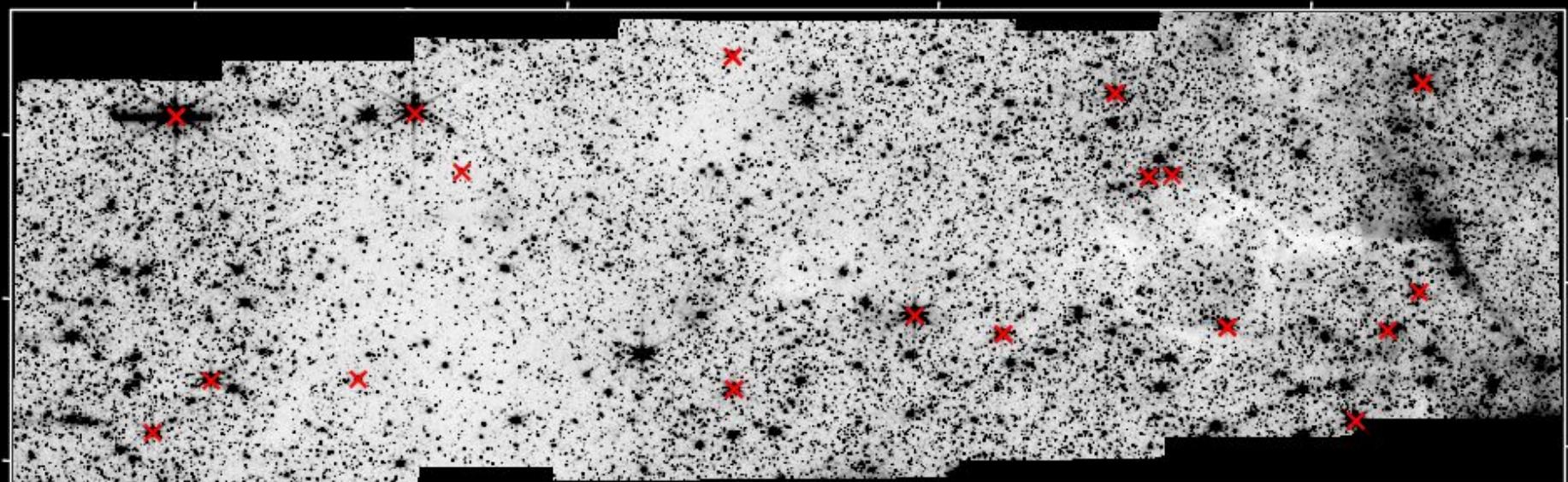
CS 2-1





17^h46^m28^s

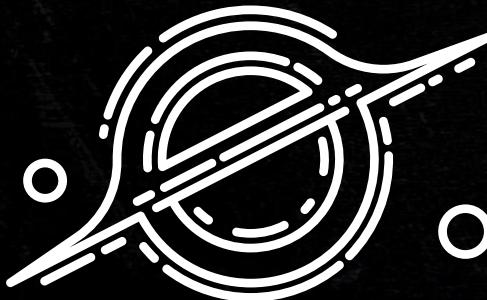
Right Ascension

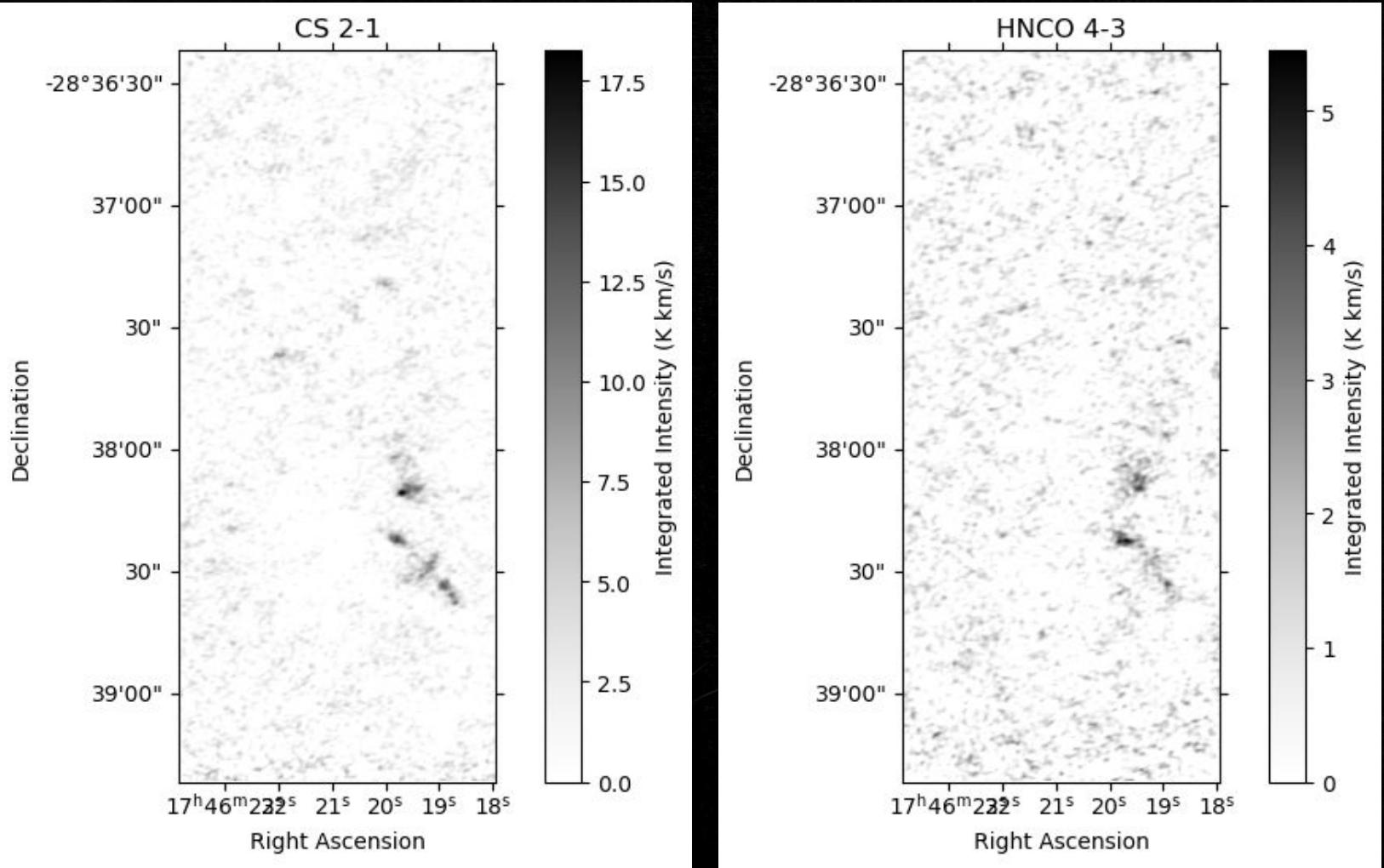


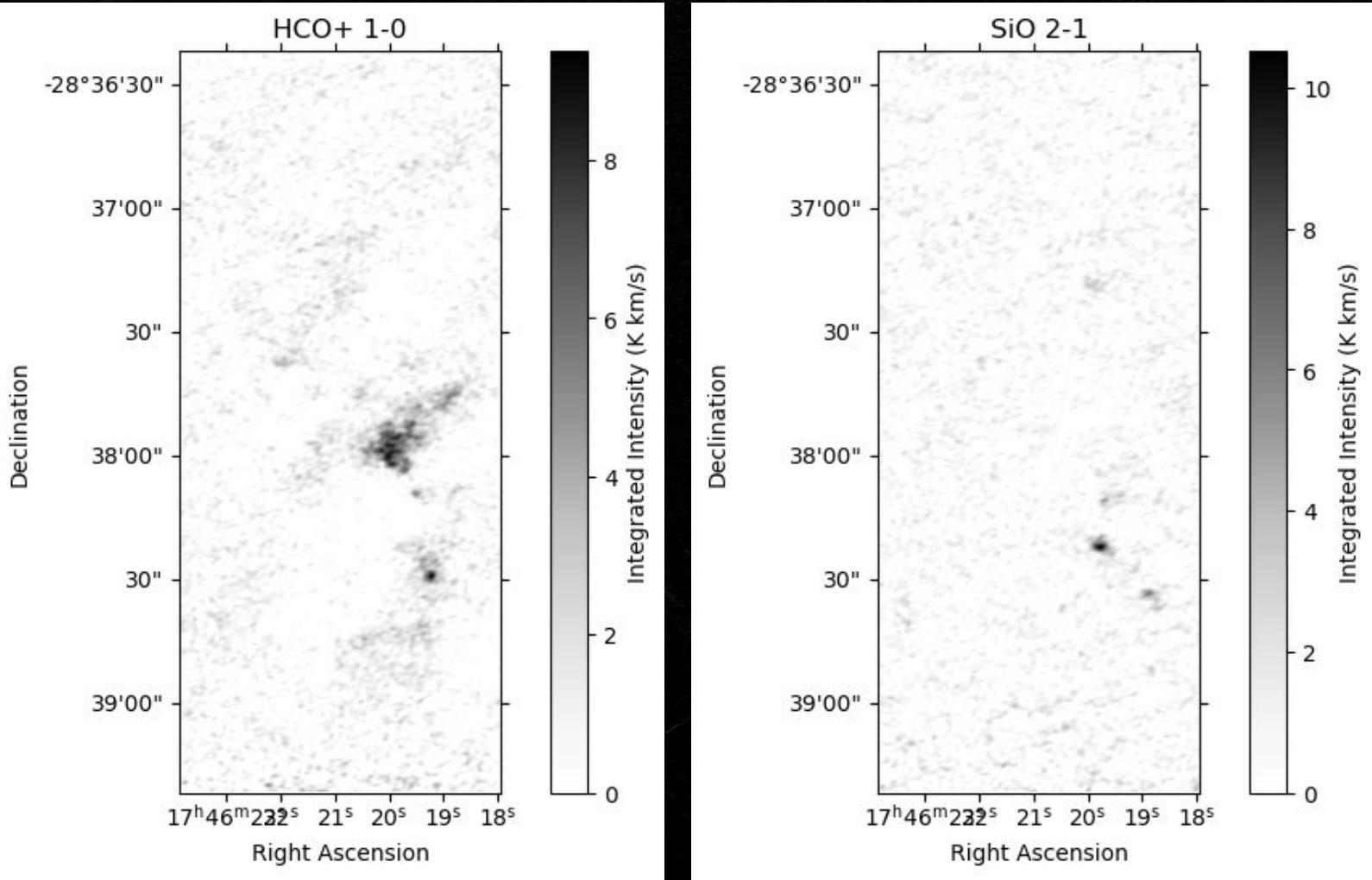
17^h46^m28^s

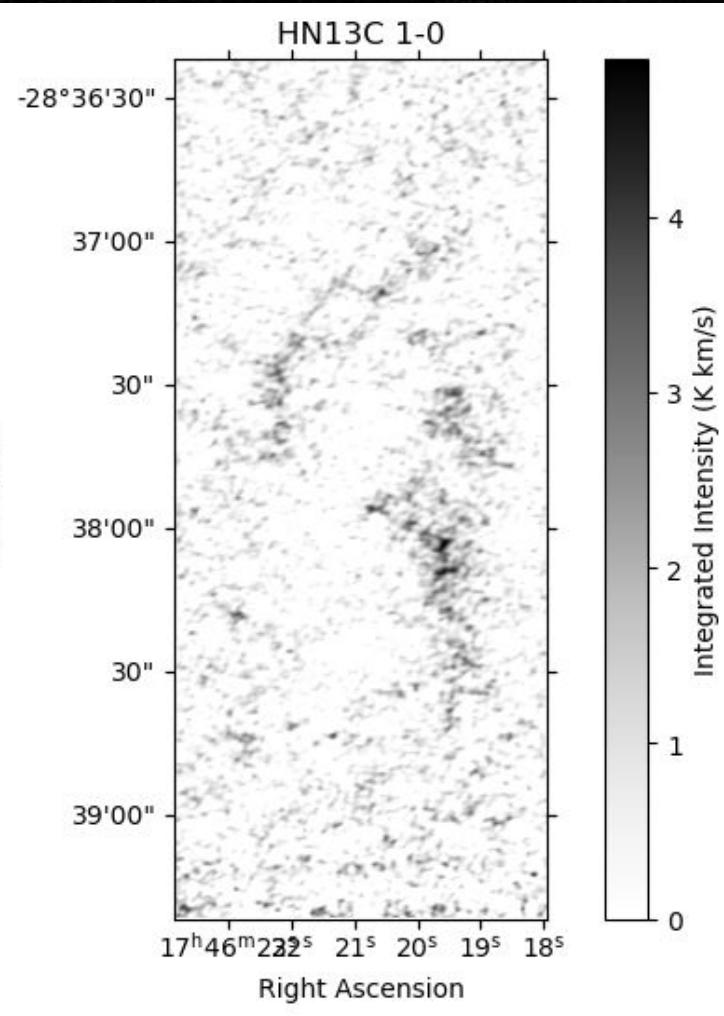
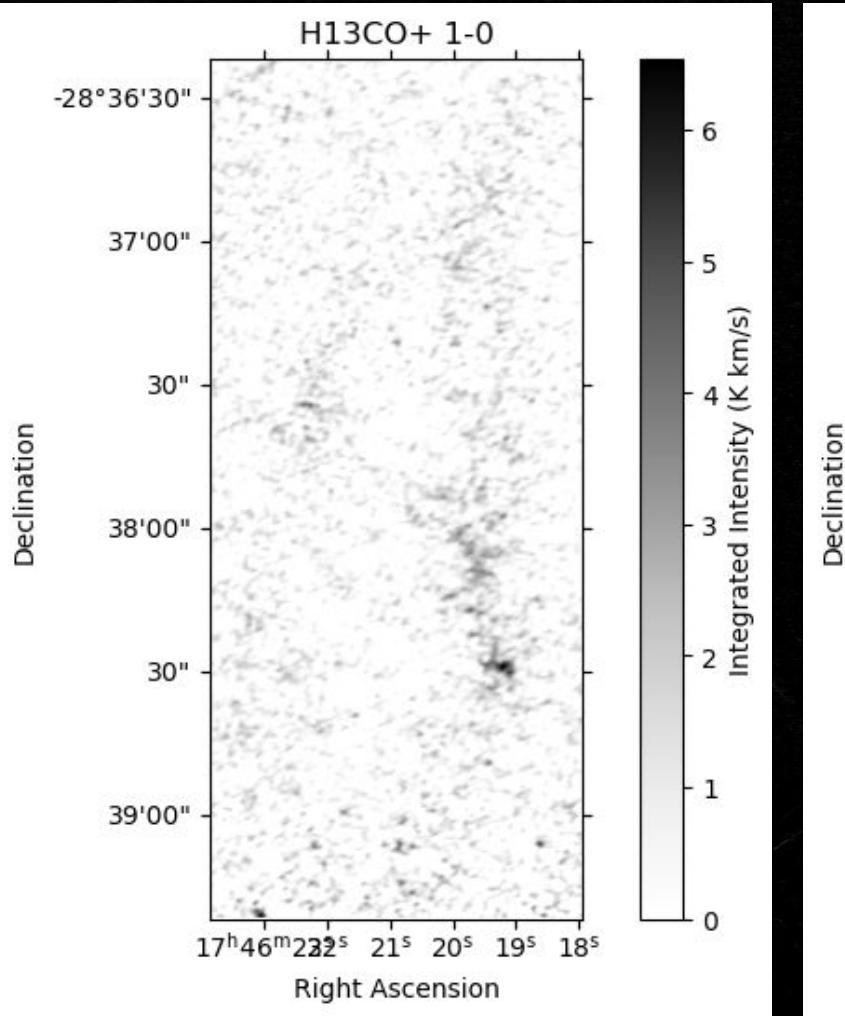
Right Ascension

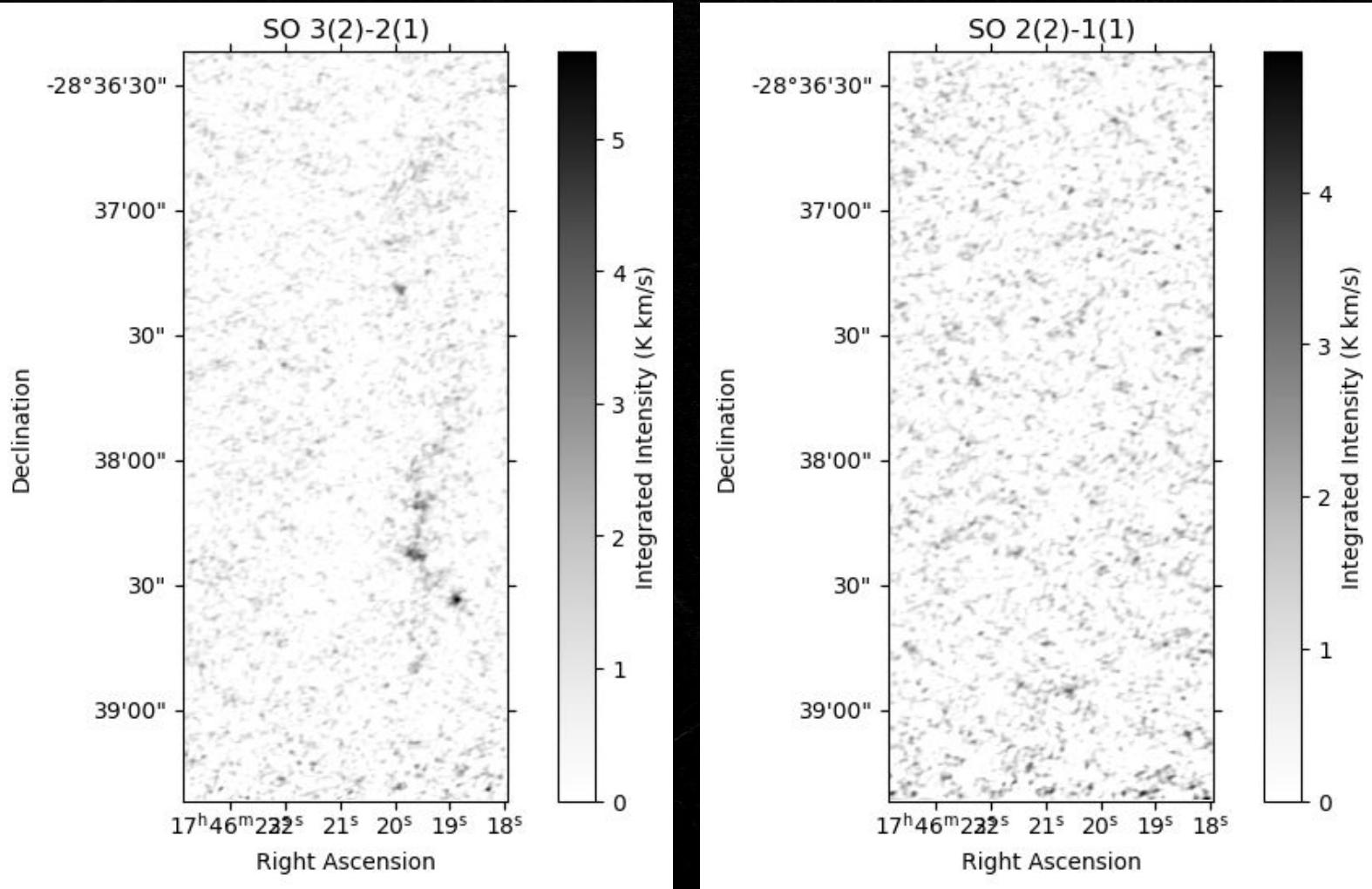
Extra Slides!

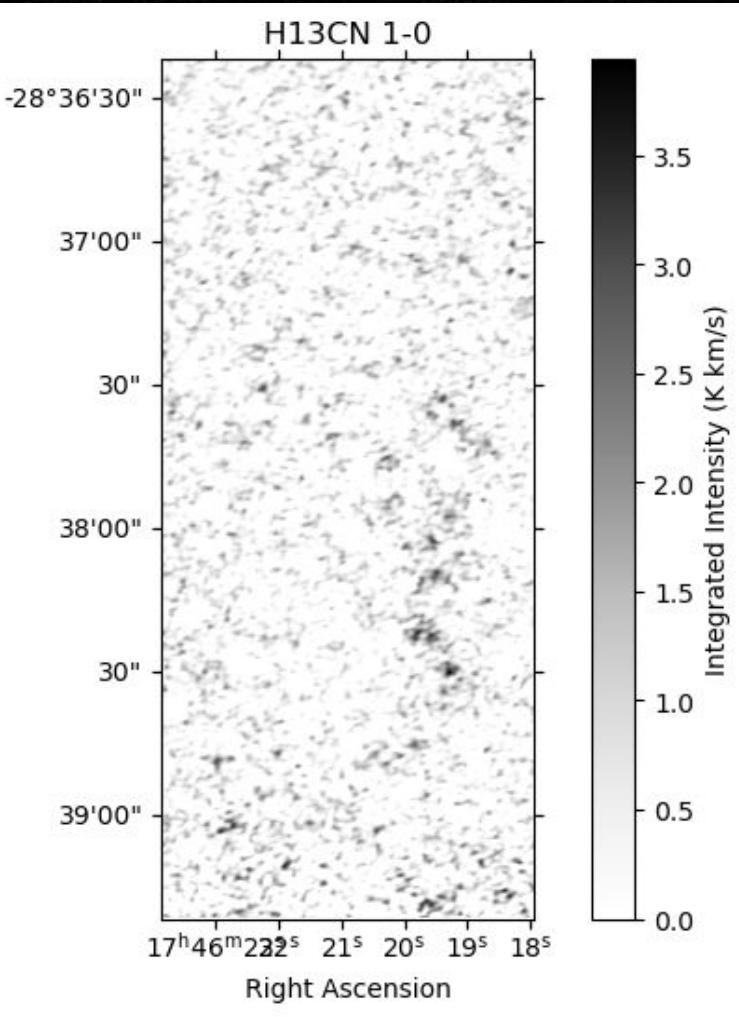
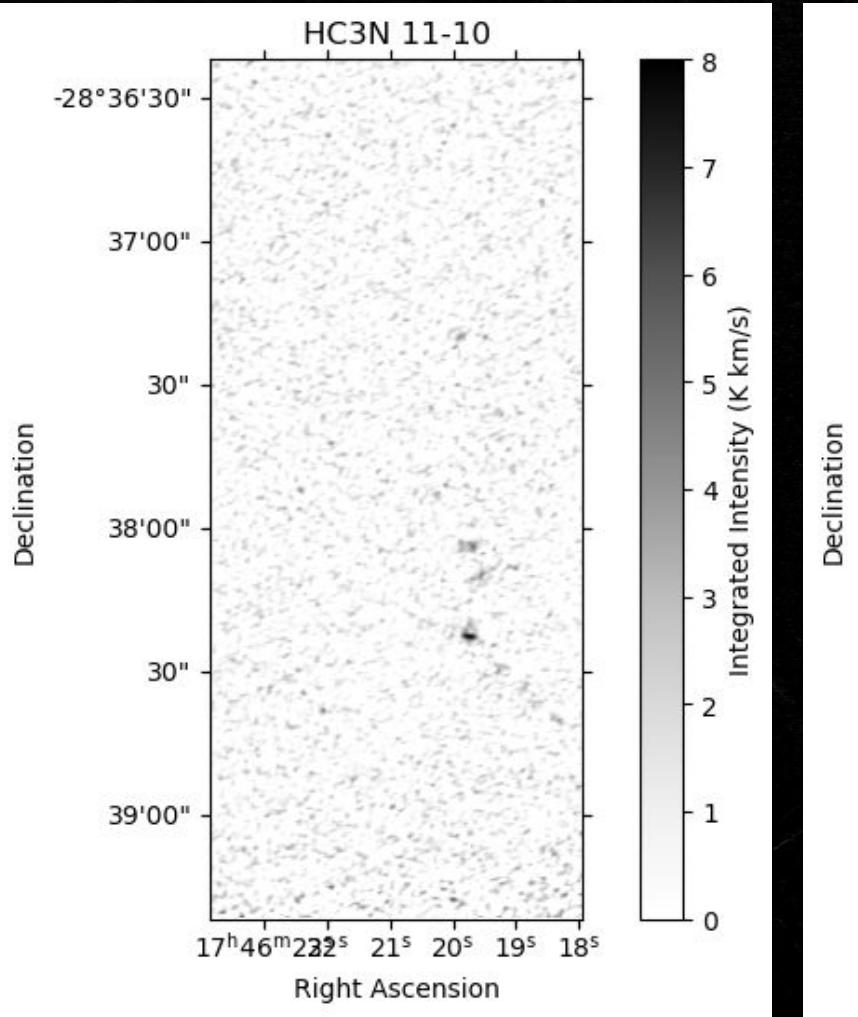


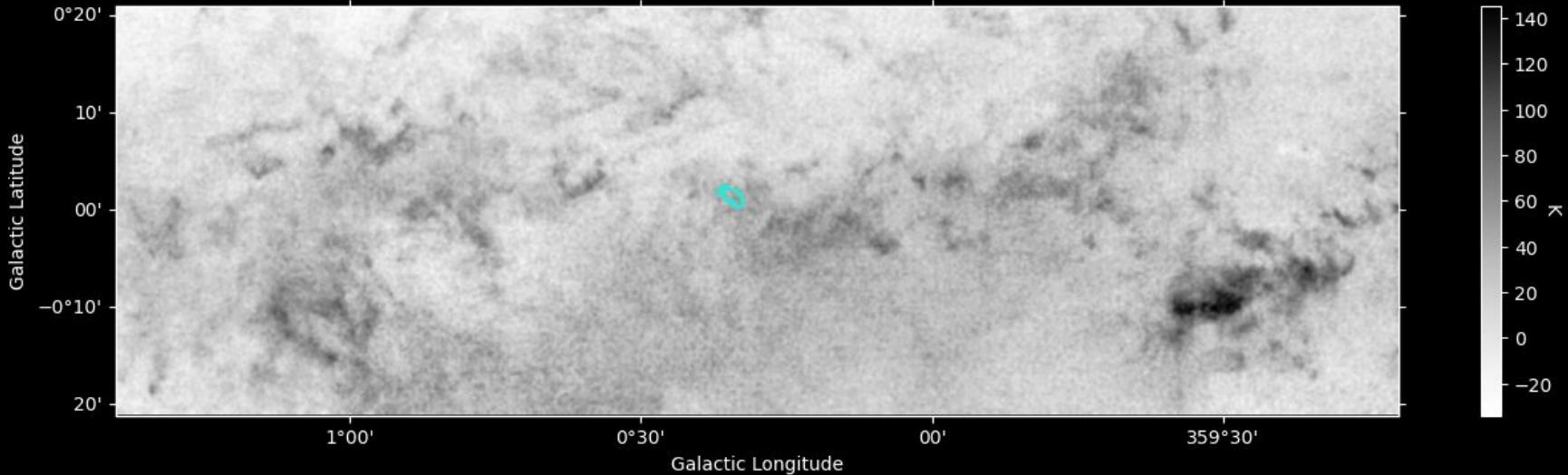




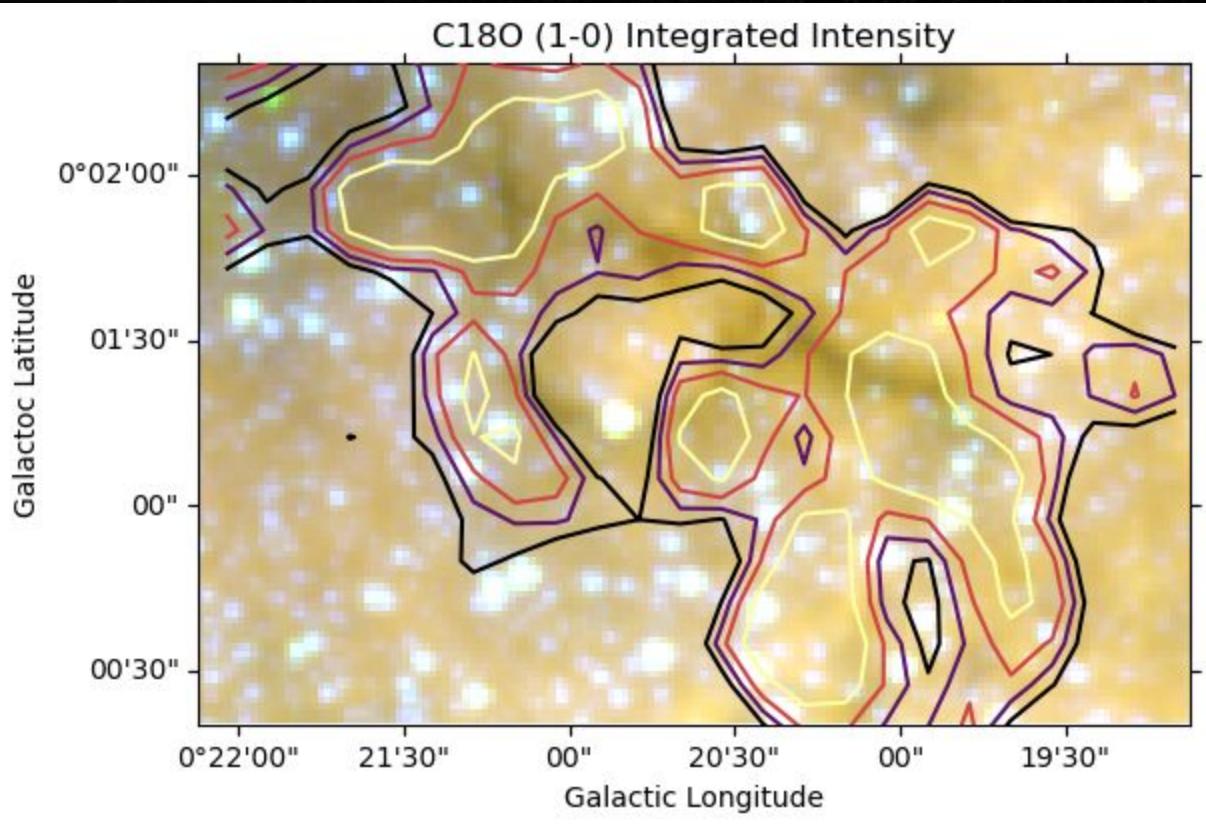






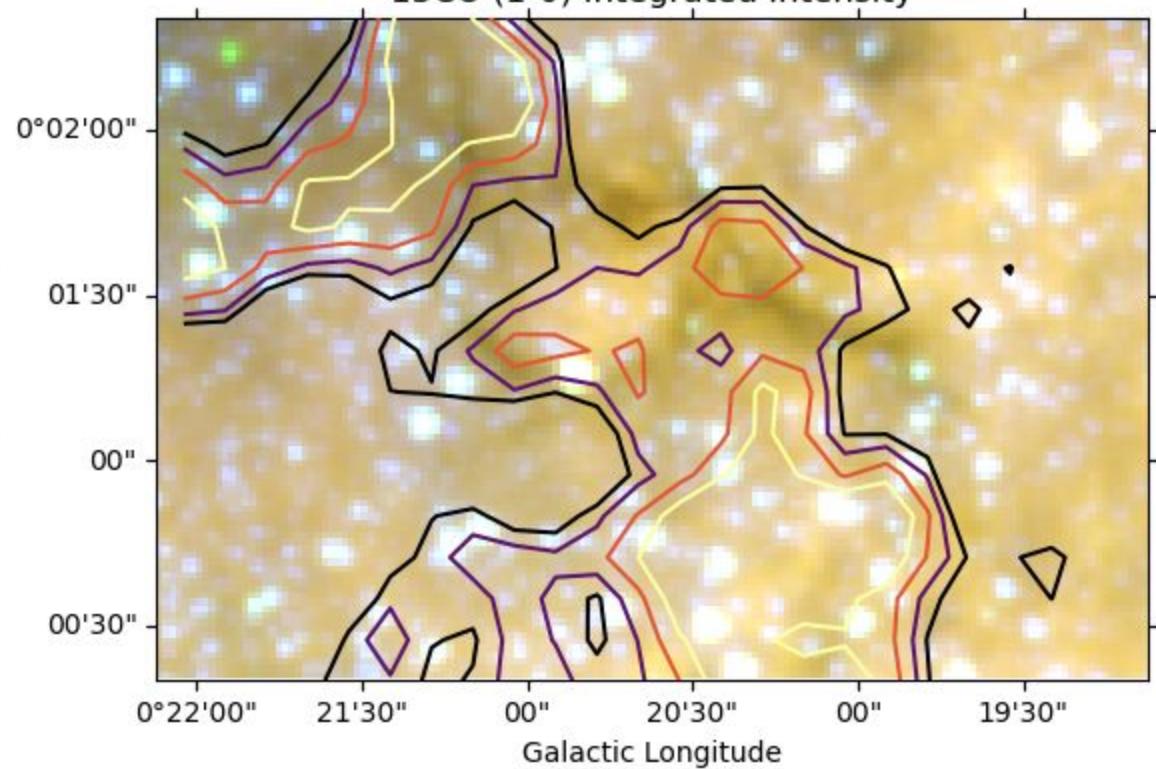


**Filament region on 12CO 1-0
moment 0 -60 to -50 km/s**



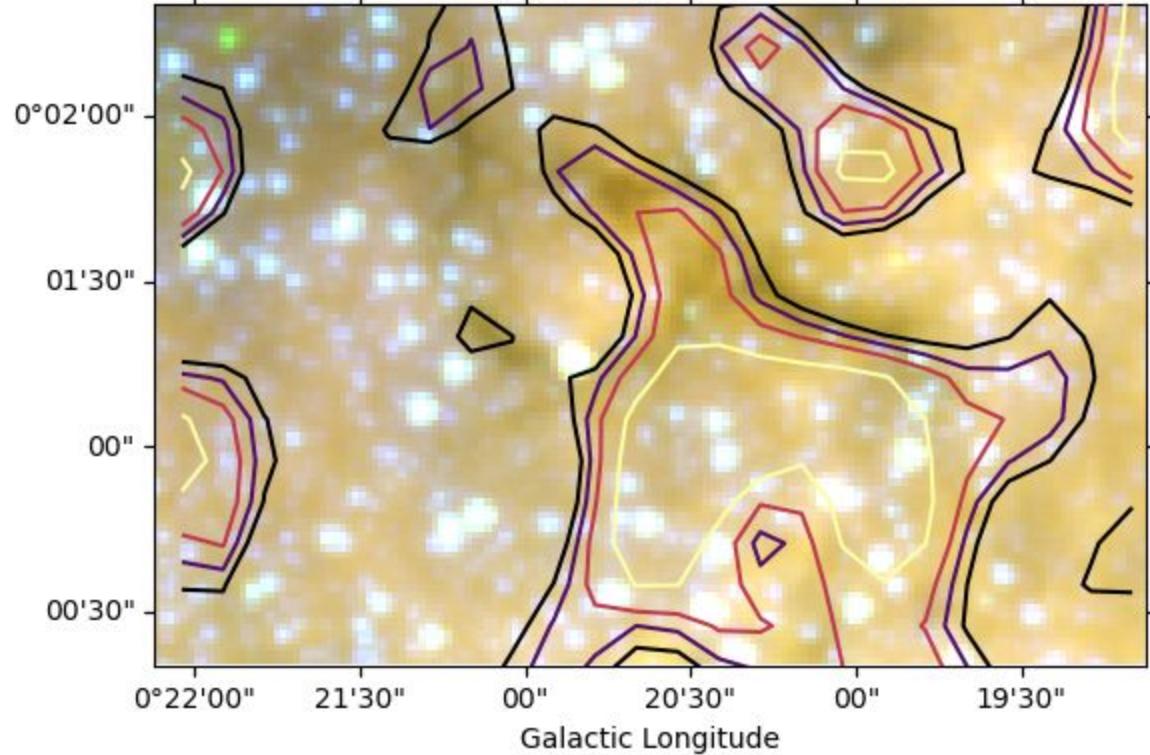
13CO (1-0) Integrated Intensity

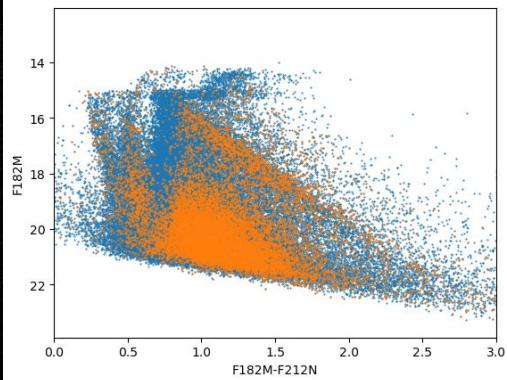
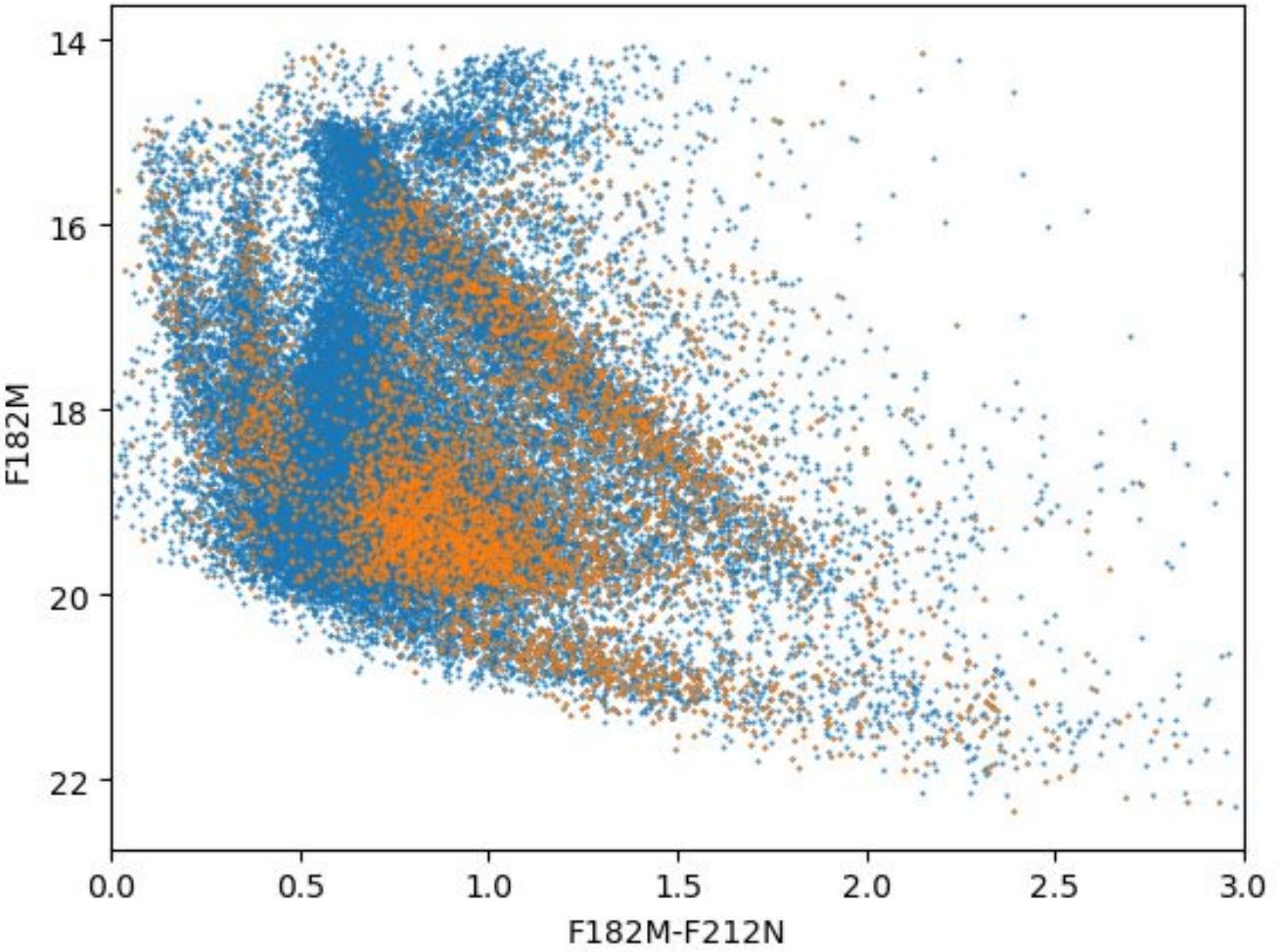
Galactoc Latitude



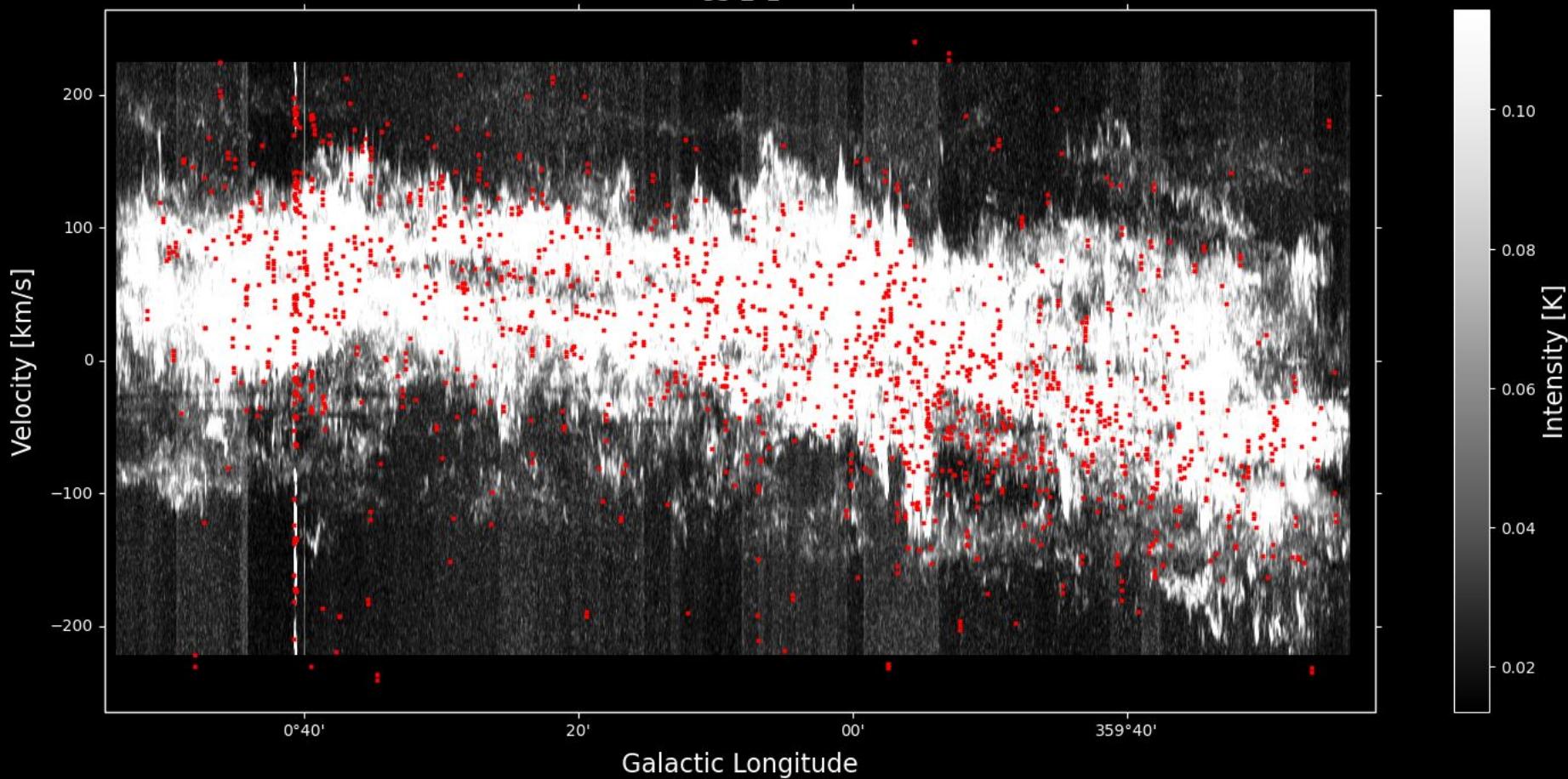
12CO (1-0) Integrated Intensity

Galactoc Latitude

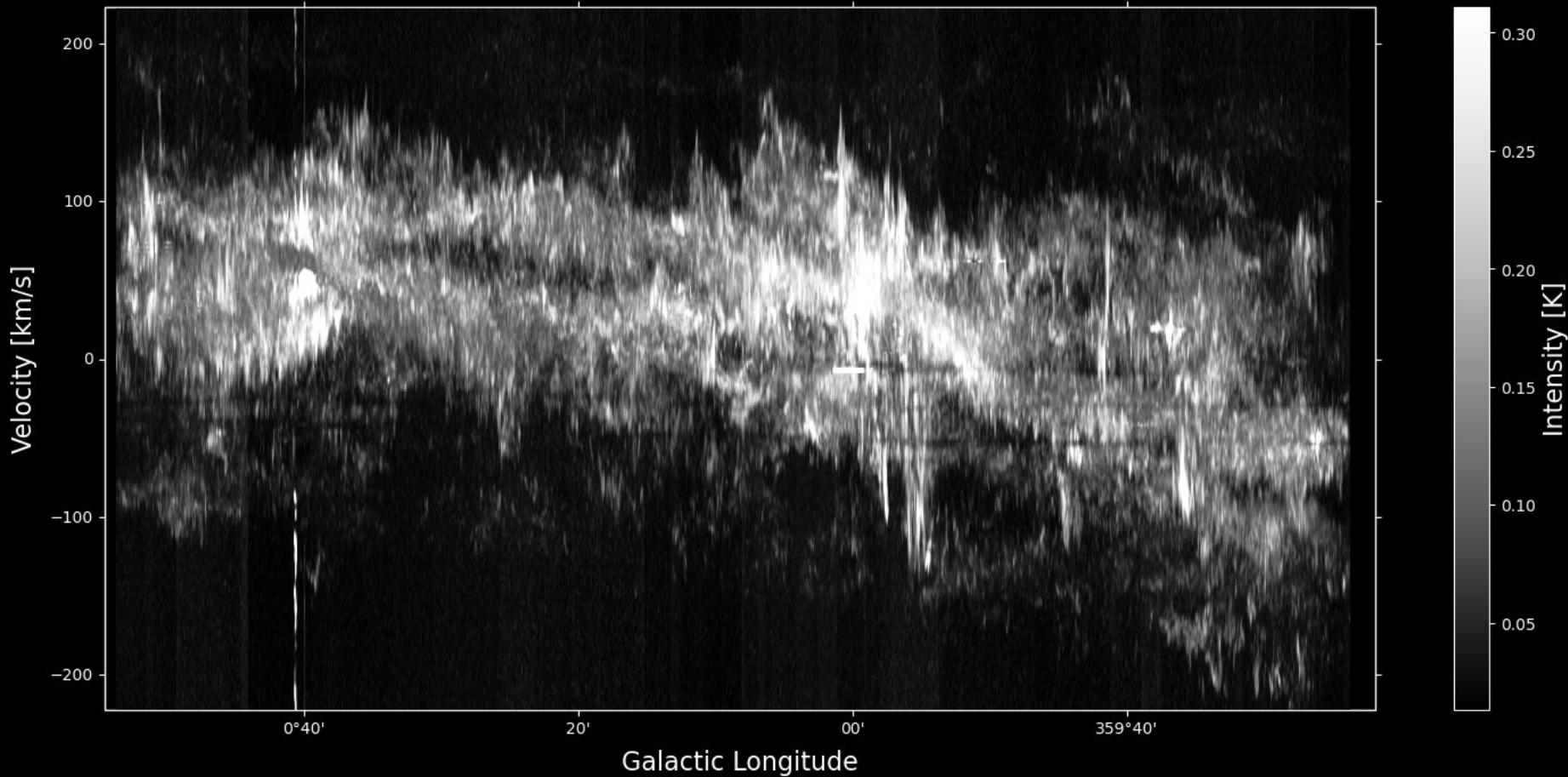




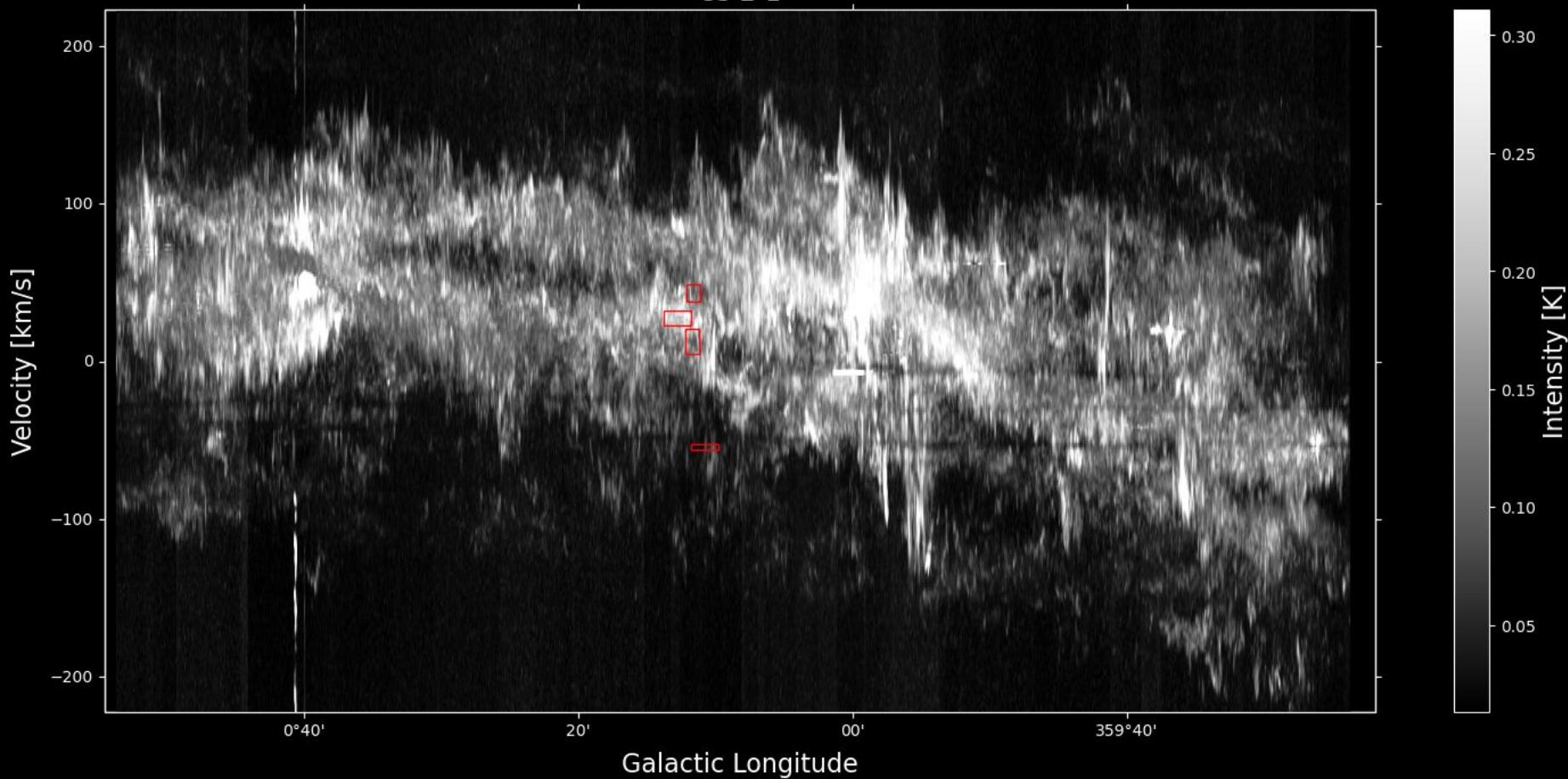
CS 2-1

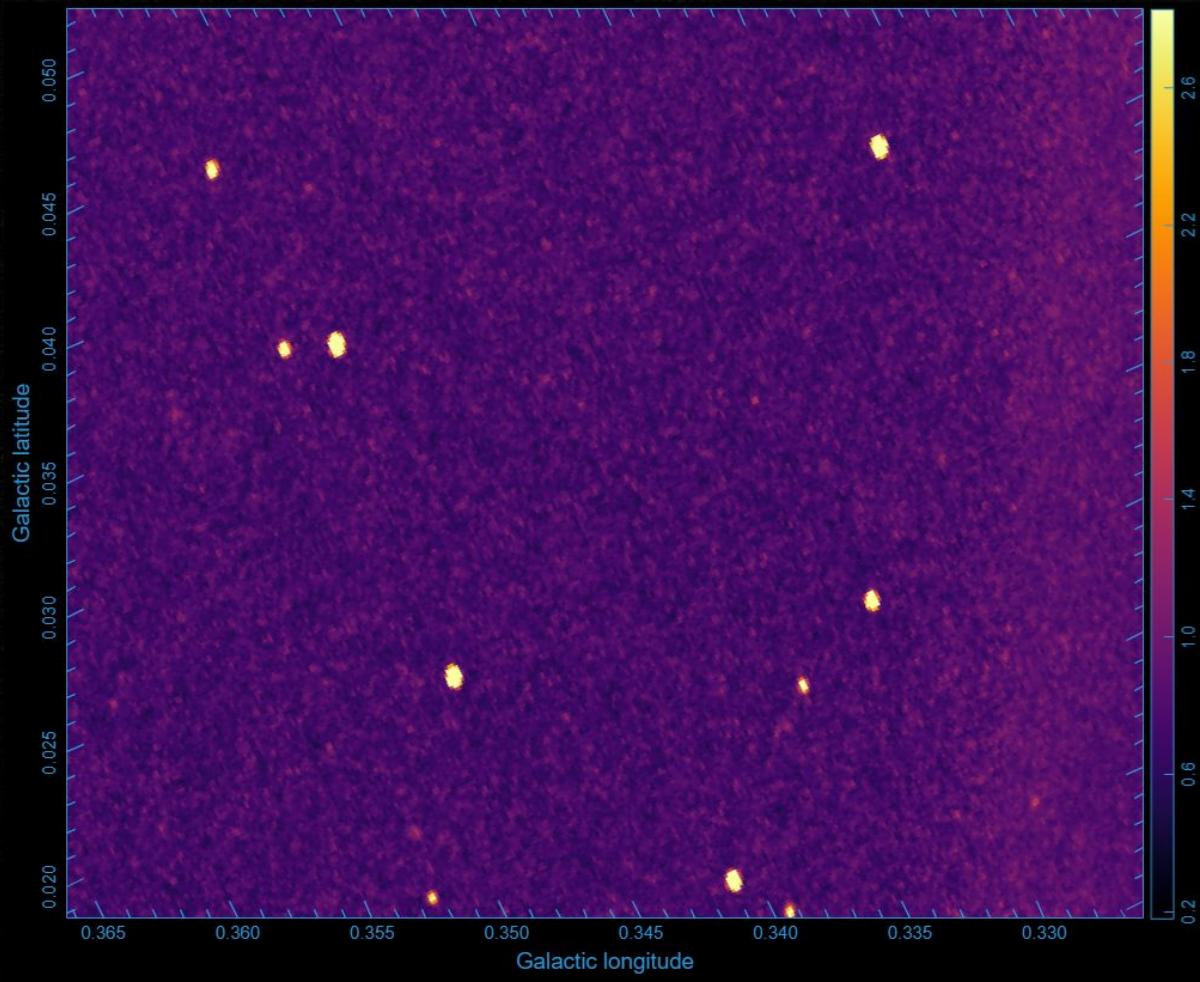


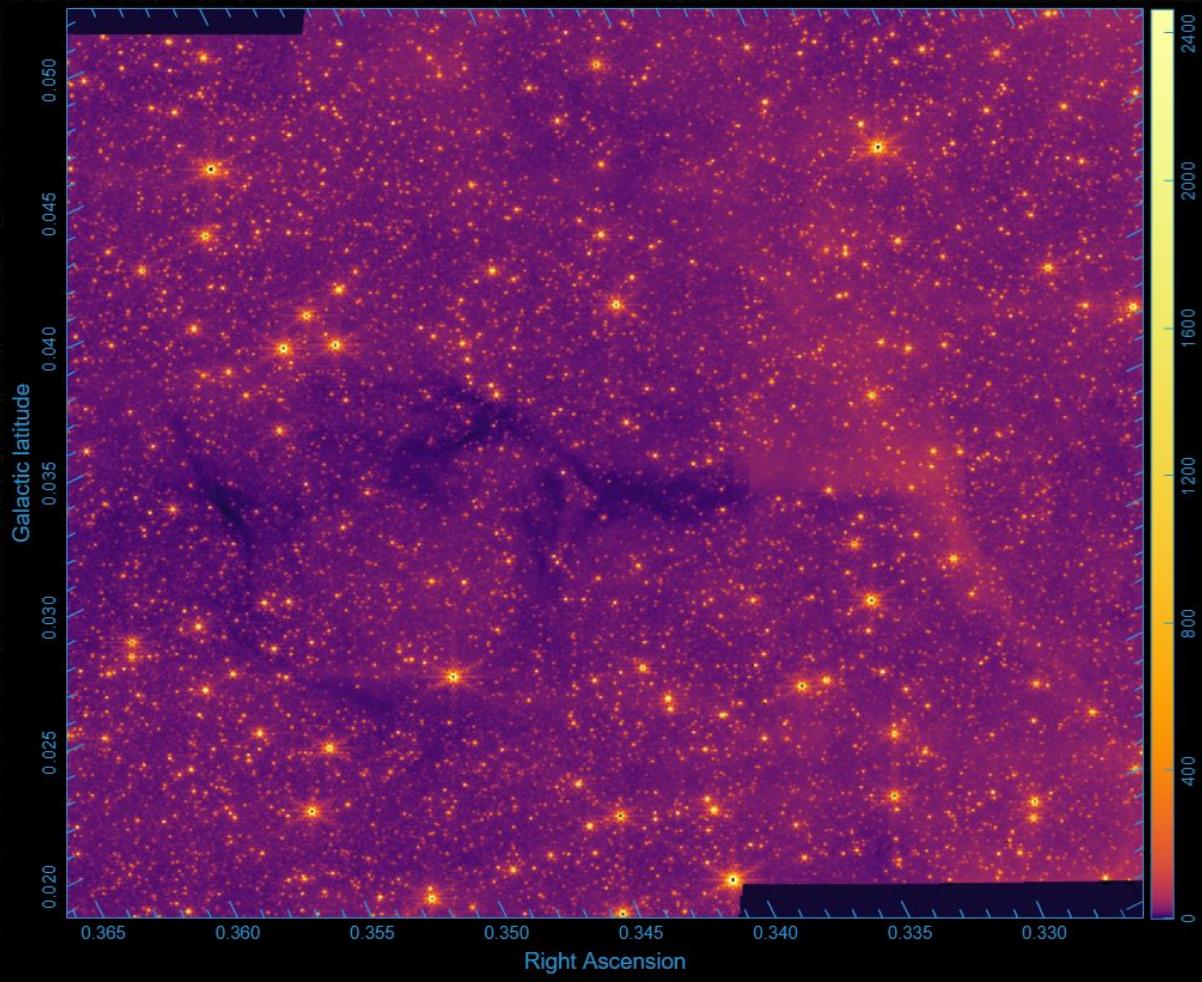
CS 2-1



CS 2-1







Credits



- ★ Data used from:
 - JWST
 - Spitzer
 - ALMA
 - ACES
 - Nobeyama

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THANKS!



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