



Credit: NRAO/AUI/NSF; Adam Ginsburg and John Bally (Univ of Colorado - Boulder), Farhad Yusef-Zadeh (Northwestern), Bolocam Galactic Plane Survey team; GLIMPSE II team

The Brick Line Survey

of a ~~hot~~ warm molecular
core in the CMZ
*and the diffuse
medium around it*

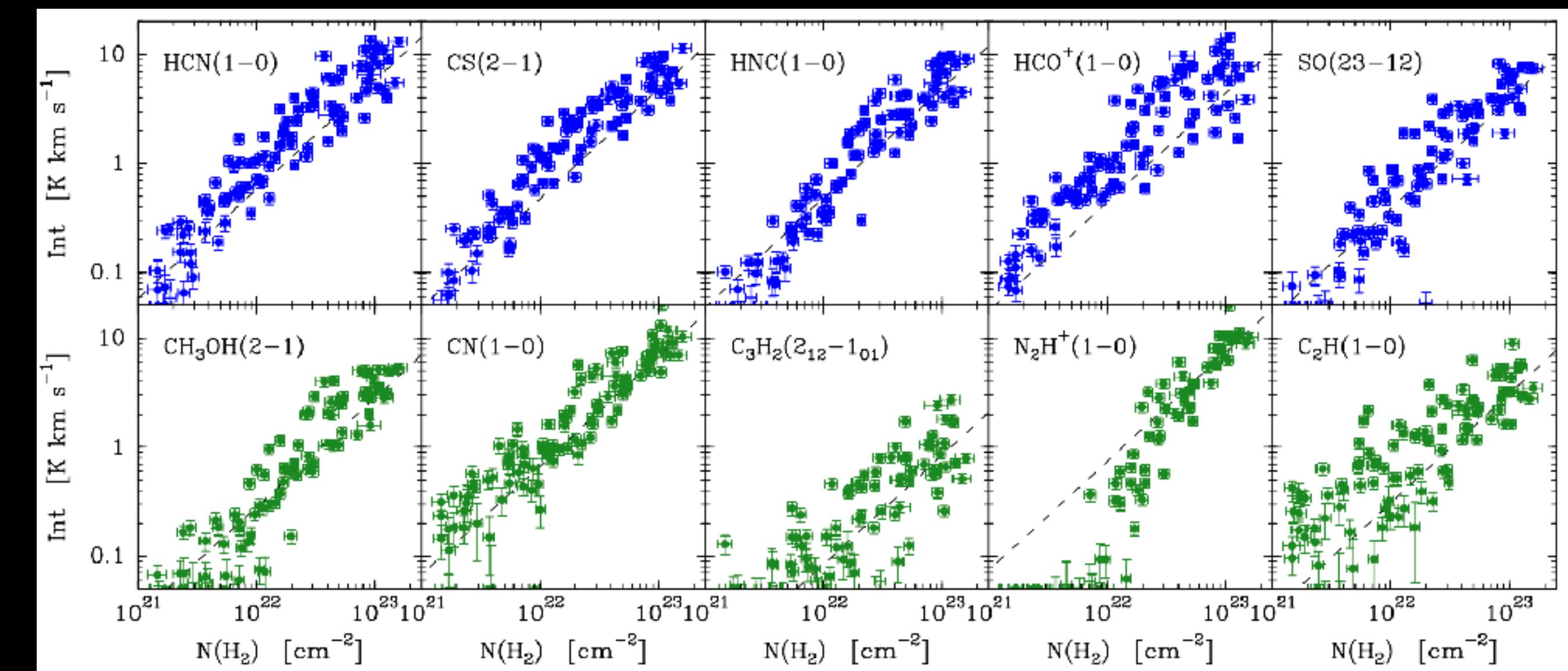
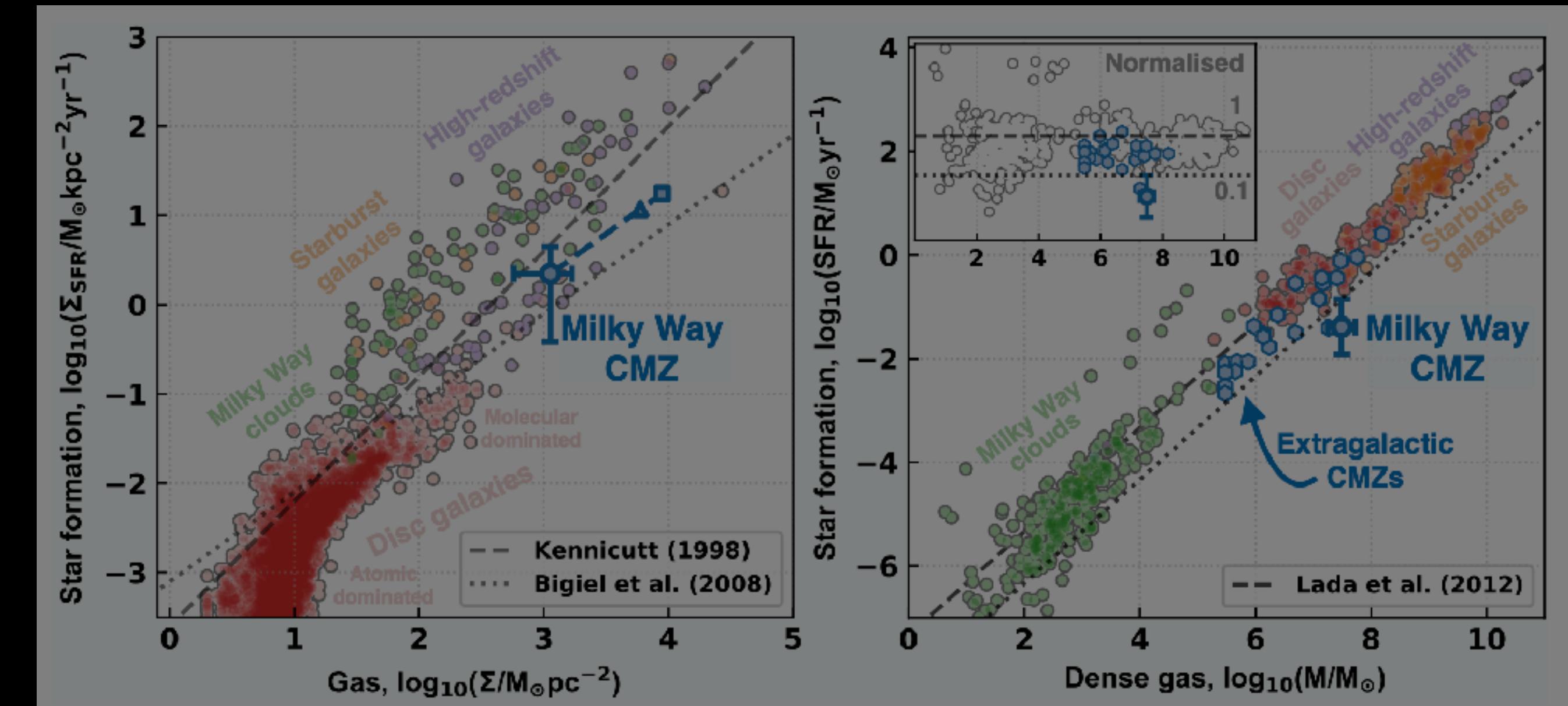
Alyssa Bulatek (she/her)
UF Astronomy PhD Candidate (advised by Adam Ginsburg)

August 5, 2024
ACES Boston Workshop

Open questions in Galactic Center star formation

- How do stars form in the Galactic Center?
- Why is star formation in the GC different than in the Galactic disk?
- What are the initial conditions for SF in the GC?
- What role do chemistry, turbulence, and gas kinematics play in GC SF?
- Why is The Brick forming so few stars?

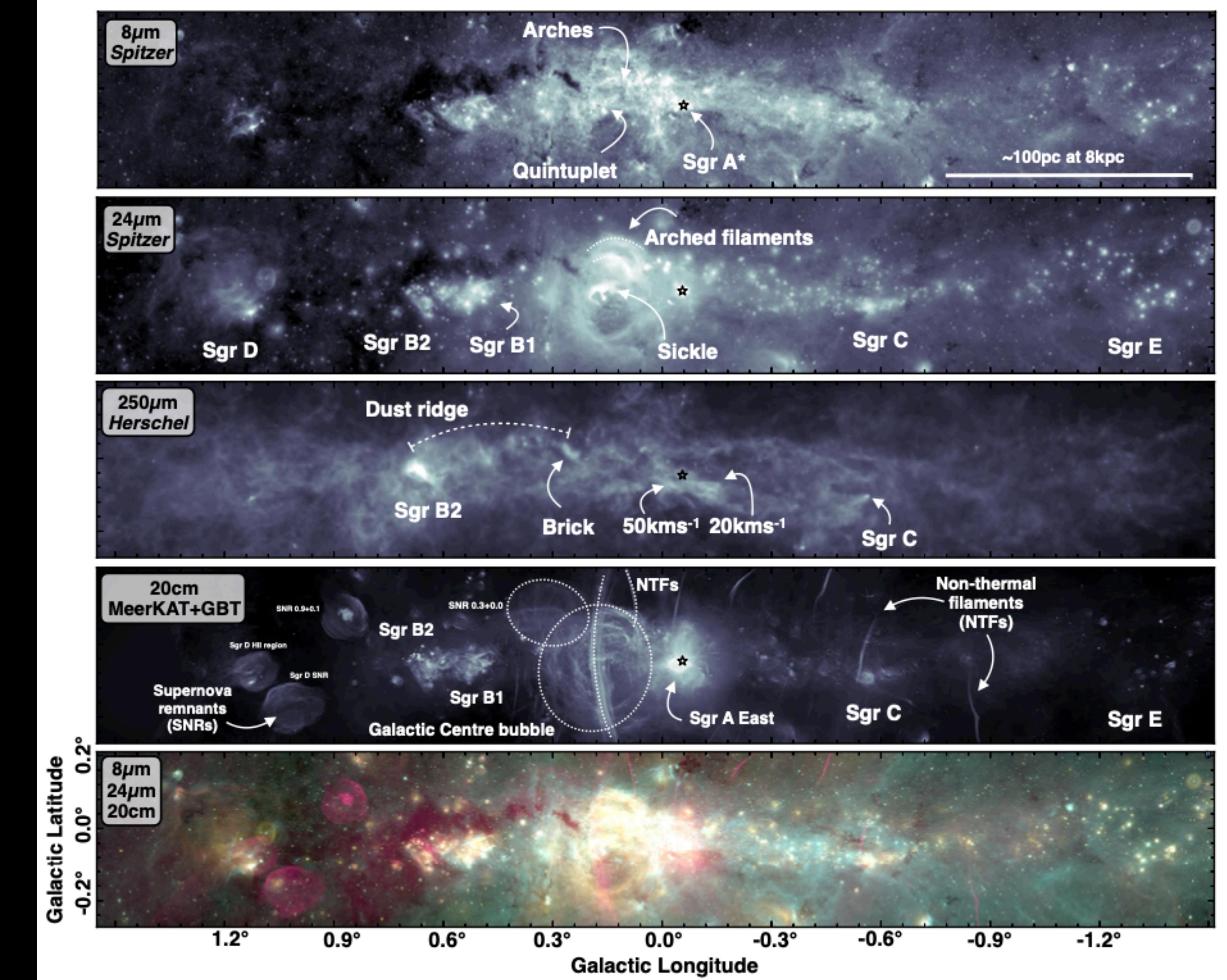
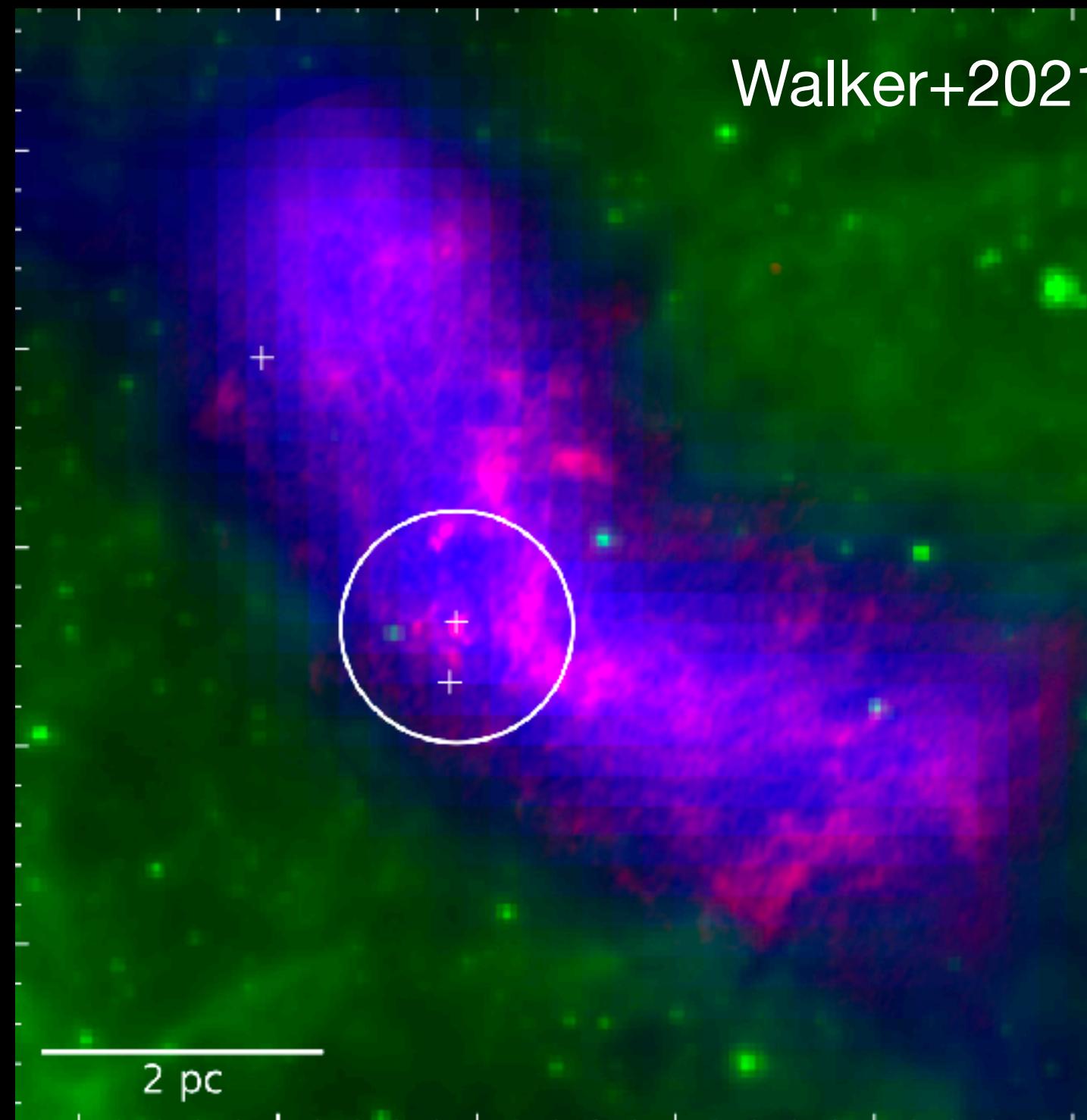
Henshaw+2023



Tafalla+2021

G0.253+0.016

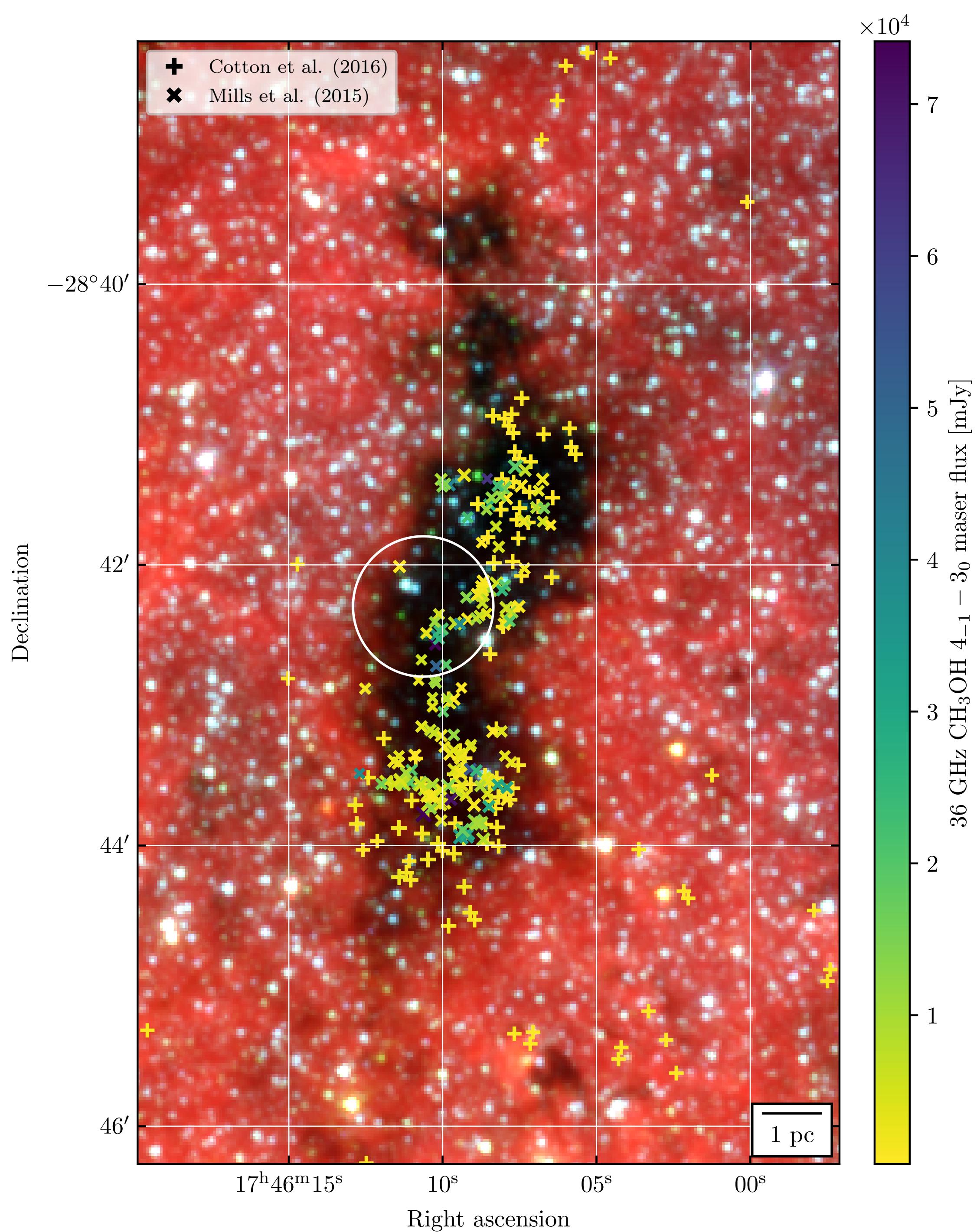
The Brick



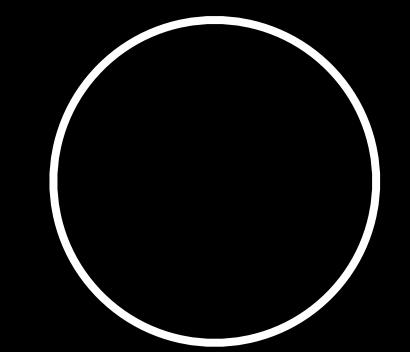
The Brick Line Survey

Bulatек+ in prep.

- Which spectral lines trace what physical processes in the Galactic Center?
- ALMA Bands 3, 4, 6
- $1''$ angular res.,
 ~ 0.25 K sensitivity
in 1 km/s channel
- LAS = $5'' - 10''$



BLSS



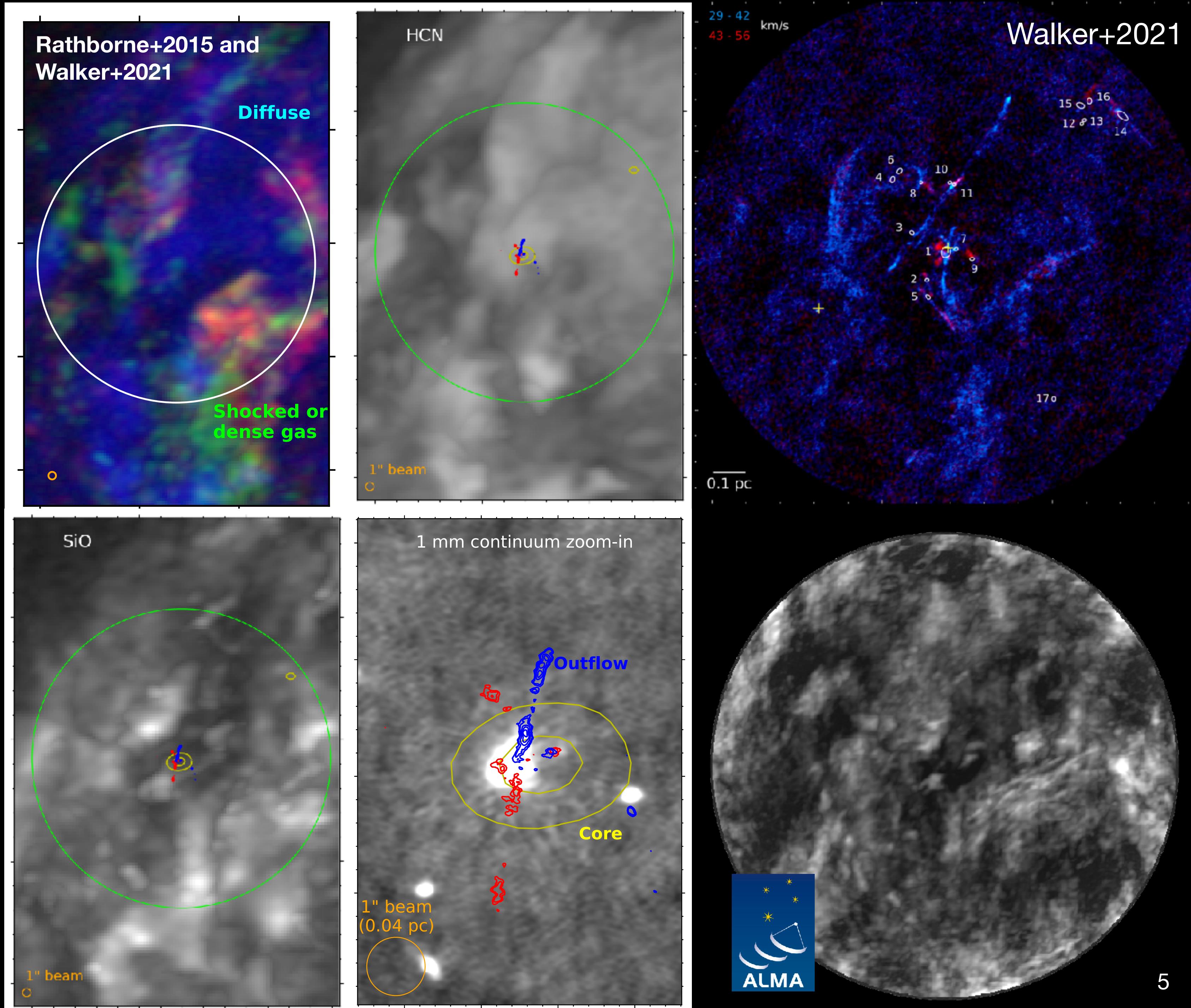
Band 3 FOV
 $r = 30'' \sim 1$ pc



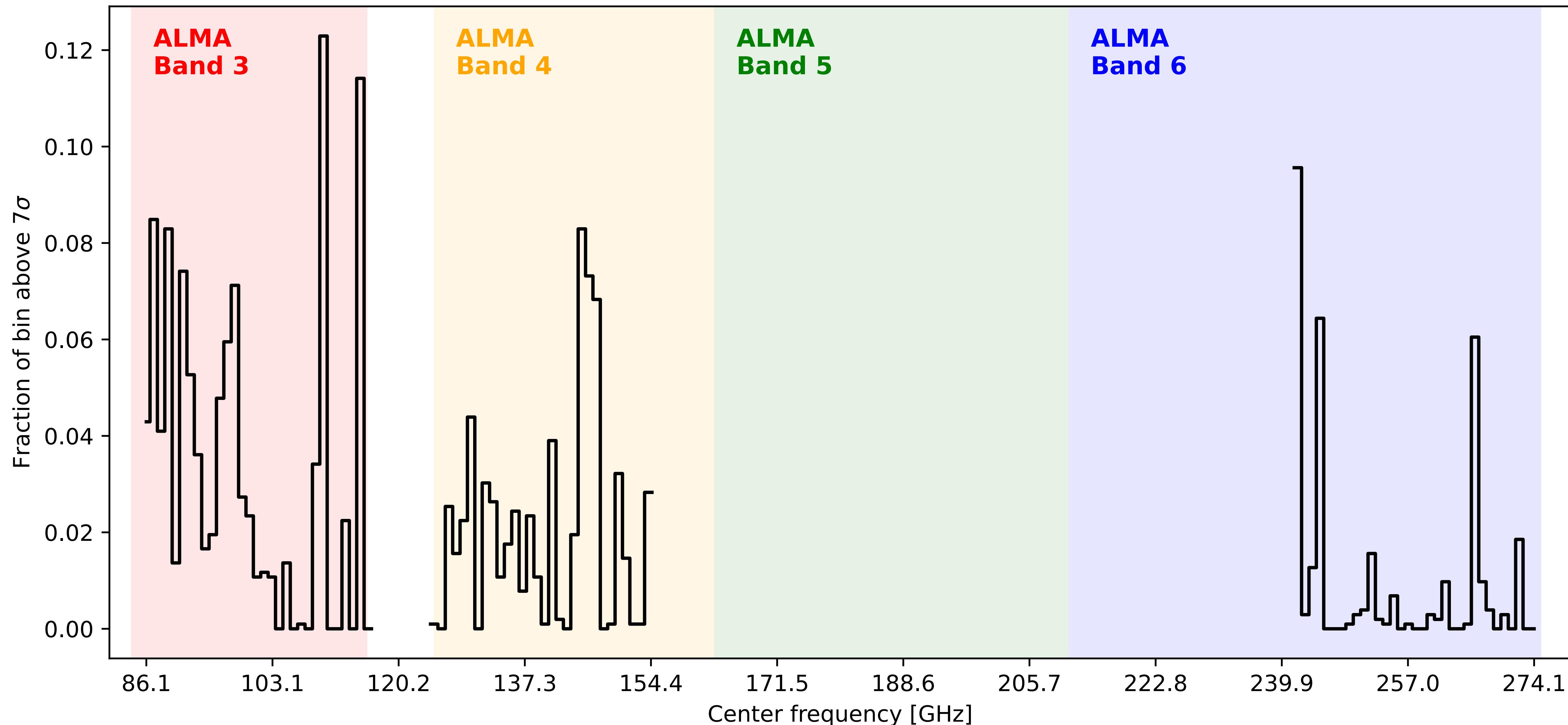
The Brick Line Survey

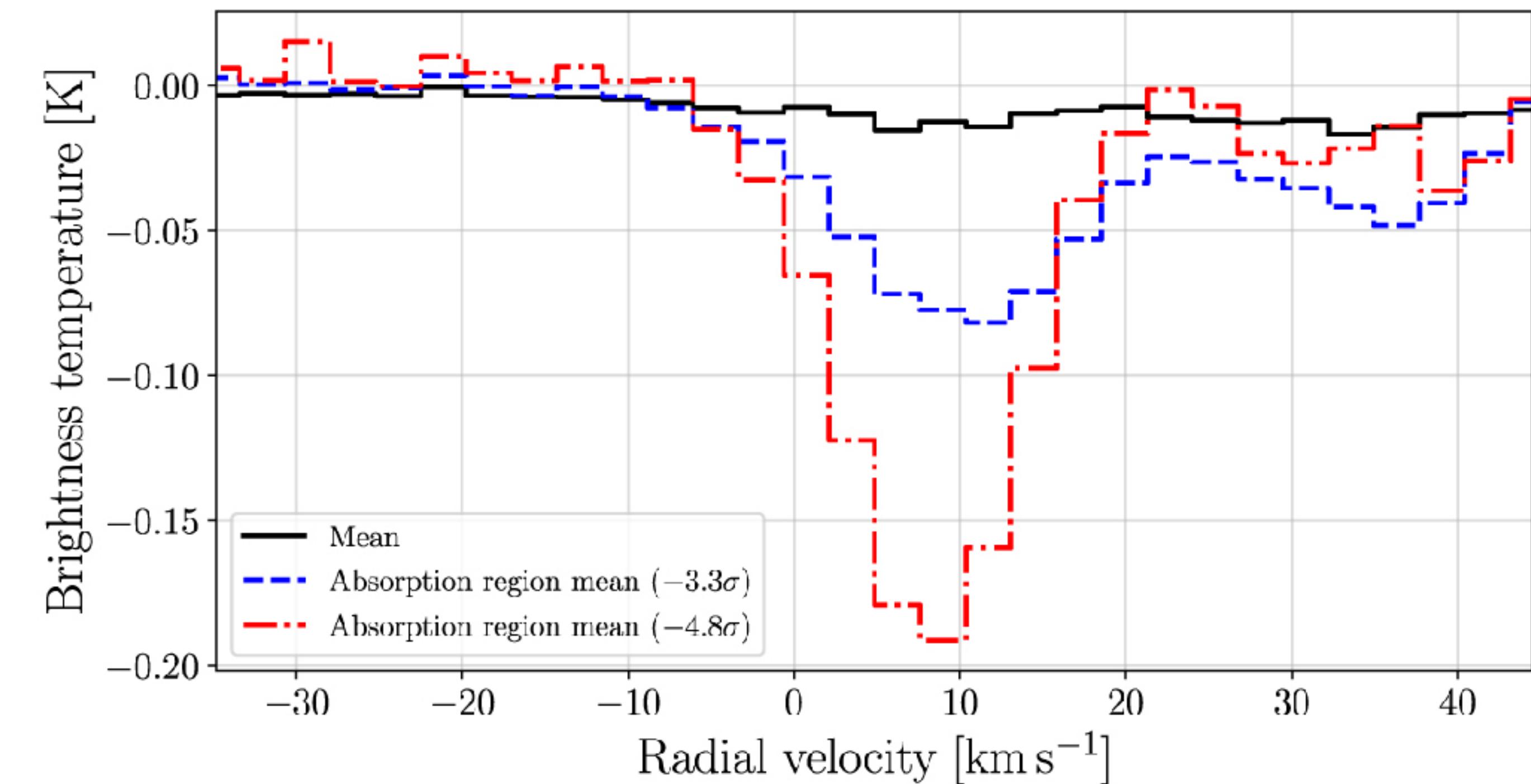
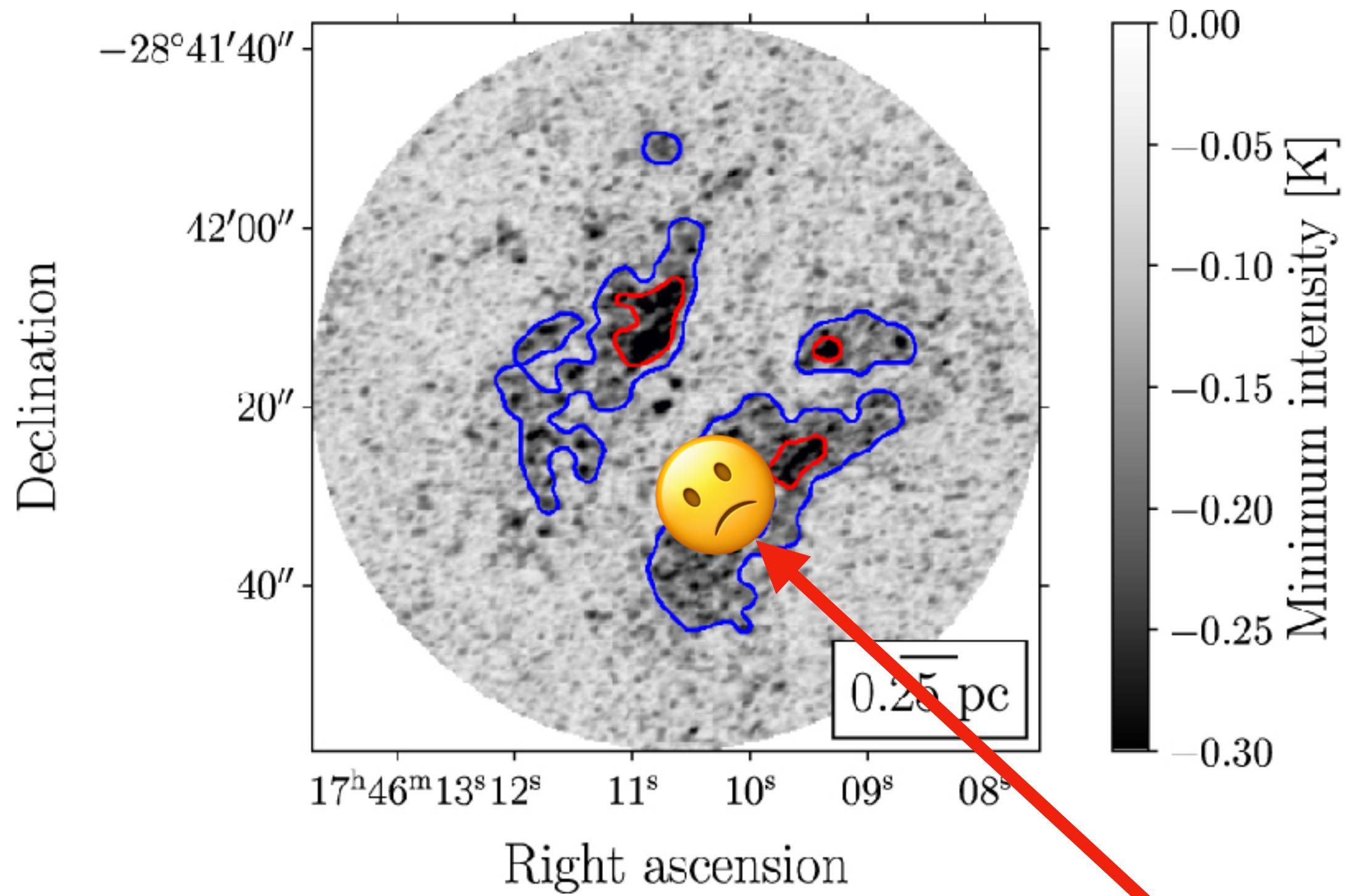
Bulatек+ in prep.

- Which spectral lines trace what physical processes in the Galactic Center?
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Line density in binned spectrum

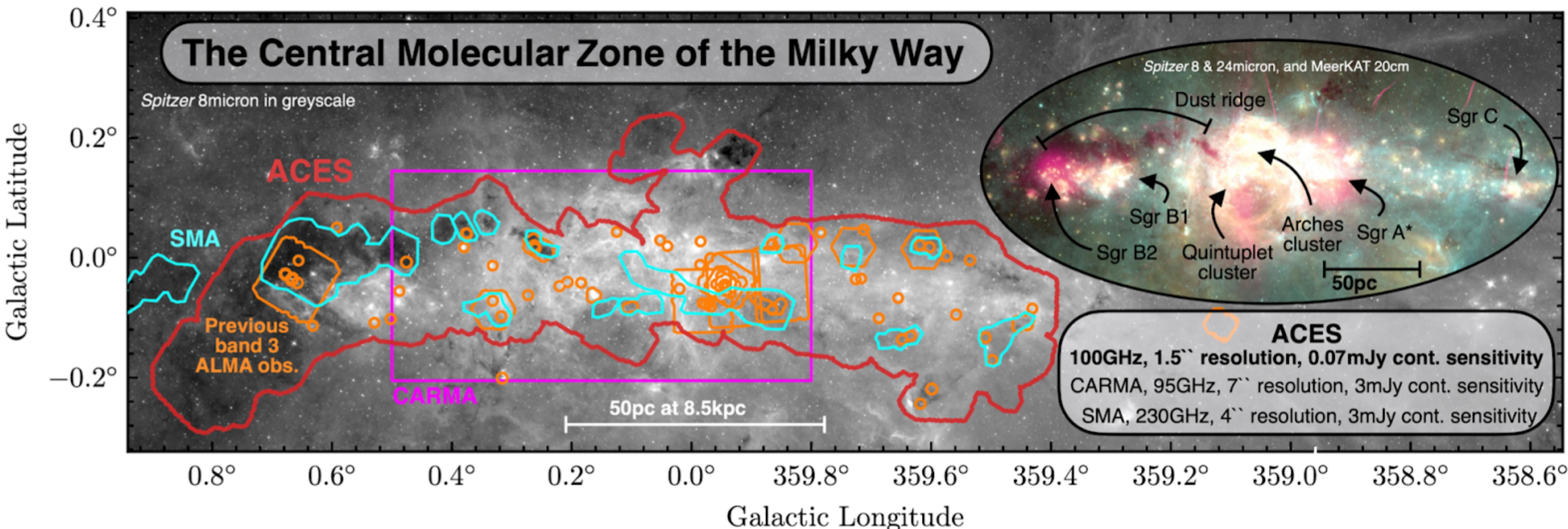




the frown :-)

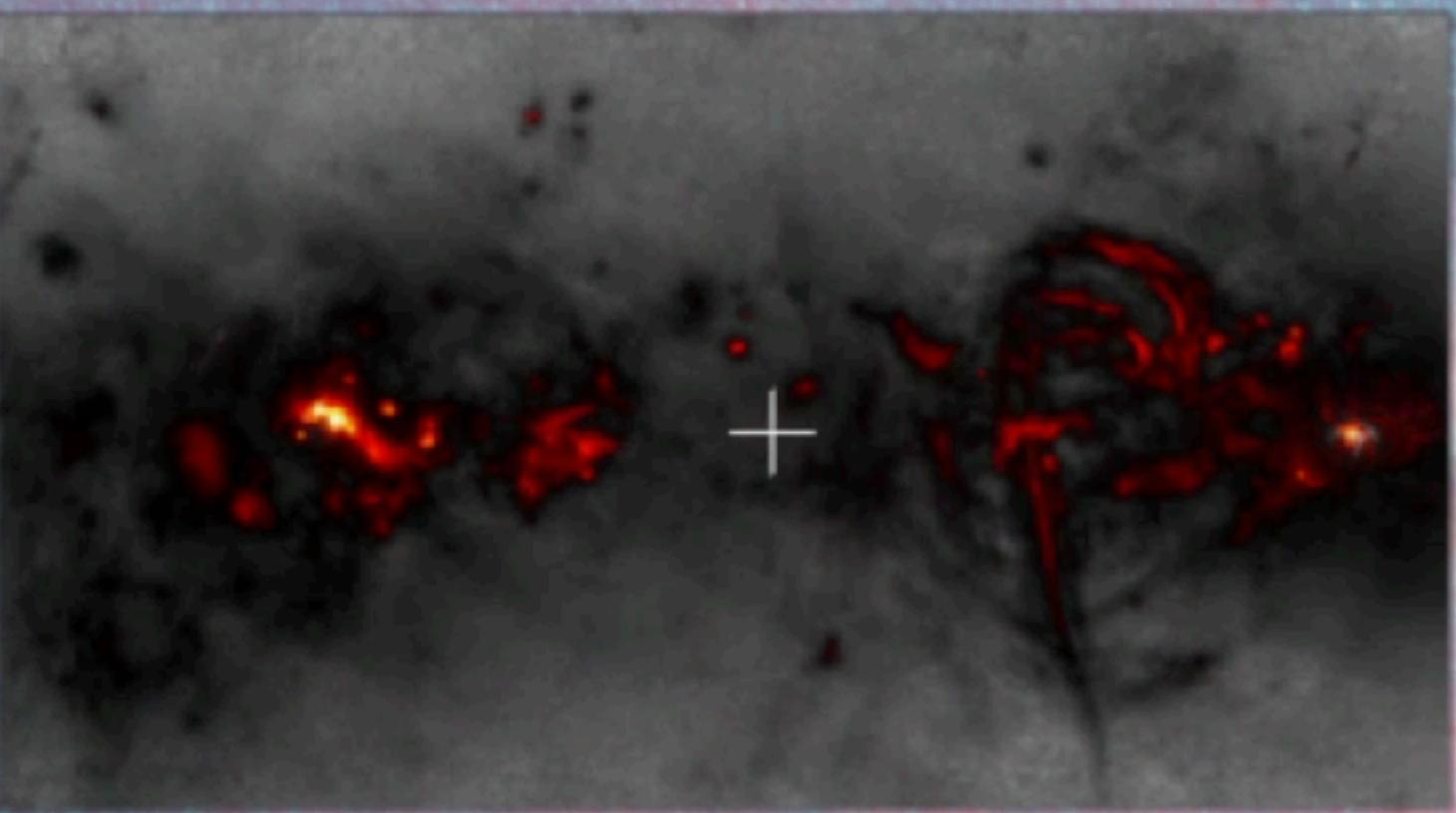
The ALMA CMZ Exploration Survey

ACES, 2021.1.00172.L (PI: Longmore)



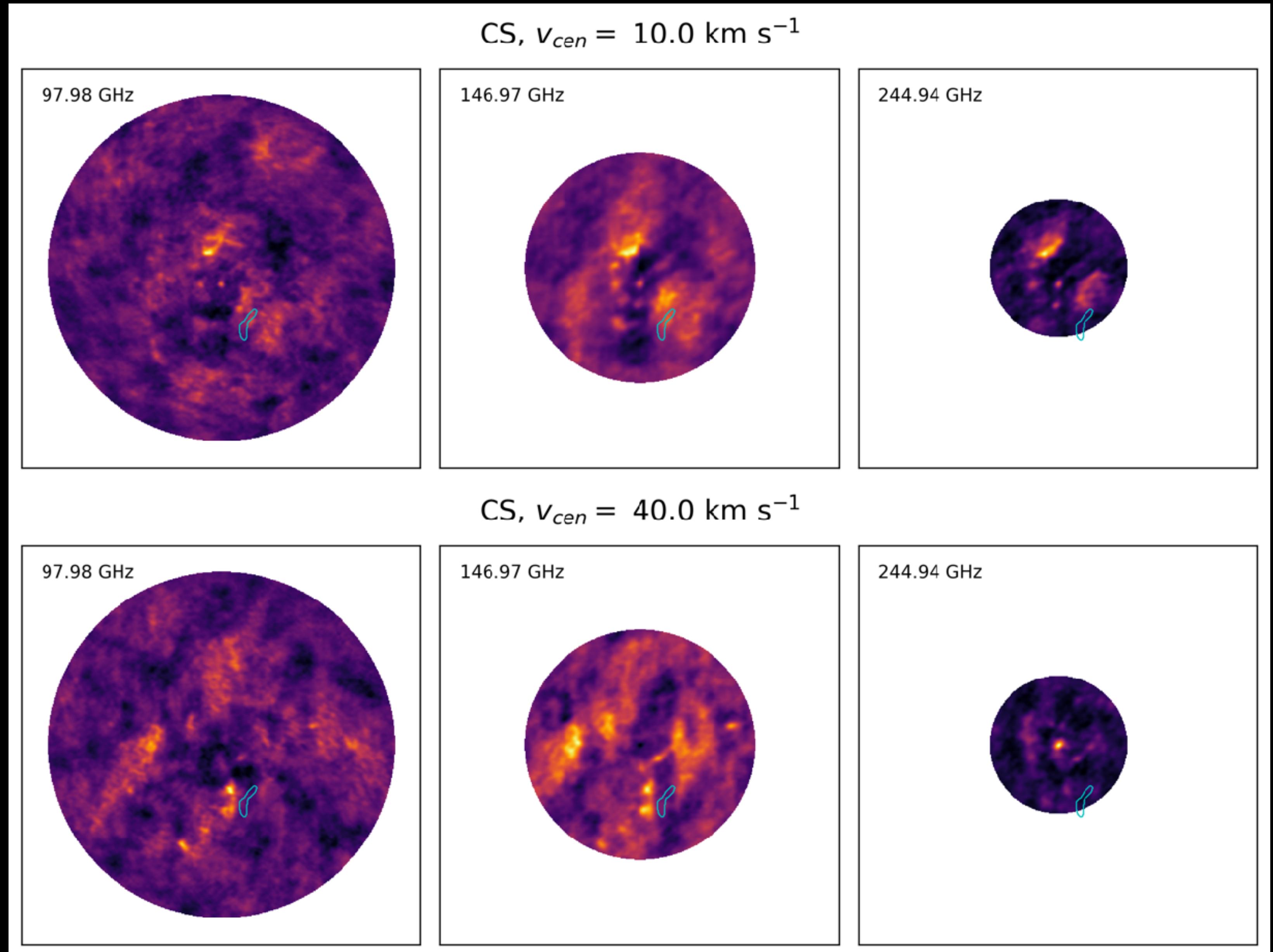
Composite image made by the ACES Collaboration

Zoom-in on The Brick



BLS tasks in progress

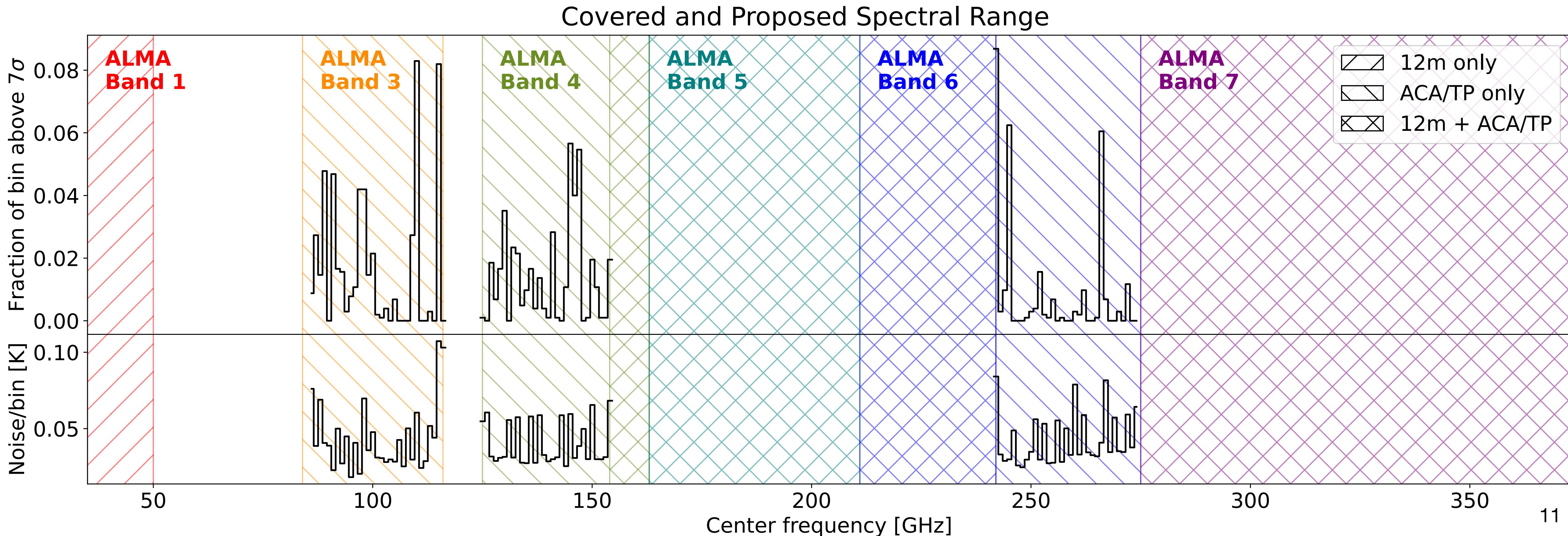
- LTE modeling of ~100+ molecules and ions
 - Measuring T_{rot} , N_{tot} , vel. params, upper limits for non-detections
 - Final goal: full line identification (not there yet)
- Continuum imaging
 - Still running, sorry :-(
 - Have initial images for 5/7 ms's (see extra slides)



Brick Line Survey Extension

- Subm. in ALMA Cycles 8, 8S, 9, 10, 11

- See more lines of more molecules in missing bandwidth
- **Cover larger angular scales with ACA/TP**



Thank you!

WLS

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abulatek@ufl.edu



abulatek.github.io

Our "sister" station in Arizona stays on 550, and that market certainly does a job in the big, buying

KQY CBS PHOENIX, ARIZONA STILL AT 550

WE'RE MOVING TO 890

WLS "Moving Day," March 29th, (we go from 870 to 890) has been amply publicized, to insure no "listener loss" to advertisers—nor missed service to listeners.

Three full page, two-color advertisements in Prairie Farmer, totaling more than 1,020,000 circulation, largely in the WLS four-state, Major Coverage Area, have impressed the new location on Mid-West farm homes—and merchants. In addition, on several pages in the March 22 issue mention was made of the new WLS frequency.

For Chicago listeners a total of eight full-column ads in the Chicago Times have told the same story. A full page back cover ad in Radio Varieties spread the news farther, and every daily and weekly newspaper in the four-state area received

a news story, written from the WLS angle, but telling the full reallocation story.

15,000 cards explaining the change were distributed to visitors to the WLS National Barn Dance and studios. We supplied servicemen with WLS tabs for push button sets, to assure the station being represented on every radio.

WLS and Prairie Farmer are using stickers on all outgoing mail. And to complete the job of getting the story to everyone, we are using every possible moment on the air to announce the new frequency and explain the reasons for the change.

So, when WLS moves up to 890, we'll have our same full-size, loyal audience moving right along with us—for they all *know* that we're moving... why we're moving... and where, too!

50,000 WATTS NBC AFFILIATE

REPRESENTED BY JOHN BLAIR & COMPANY

The PRAIRIE FARMER STATION

BURRIDGE D. BUTLER President

GLENN SNYDER Manager

CHICAGO

Appendix

WCS: (17:46:00.94, -28:42:33.9); Image: (681, 202); Polarization: Stokes I

85 – 101 GHz

Declination
41.30
42.00
30
-28.43.00
30

20 18 16 14 12 10 8 6 4 2

Right ascension



WCS: (17:46:03.01, -28:41:11.0); Image: (590, 478); Polarization: Stokes I

89 – 105 GHz

Declination

41:30

42:00

30

-28:43:00

30

20

18

16

14

12

10

17:46:10

08

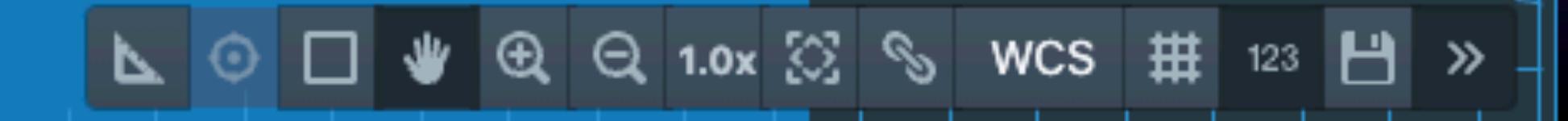
06

04

02

»

Right ascension



0.00029

0.00020

0.00011

0.00002

-0.00007

-0.00016

WCS: (17:46:10.64, -28:42:17.9); Image: (256, 256); NaN*; Polarization: Stokes I

93 – 109 GHz

Declination

41:30

42:00

30

-28:43:00

30

20

18

16

14

12

10

8

6

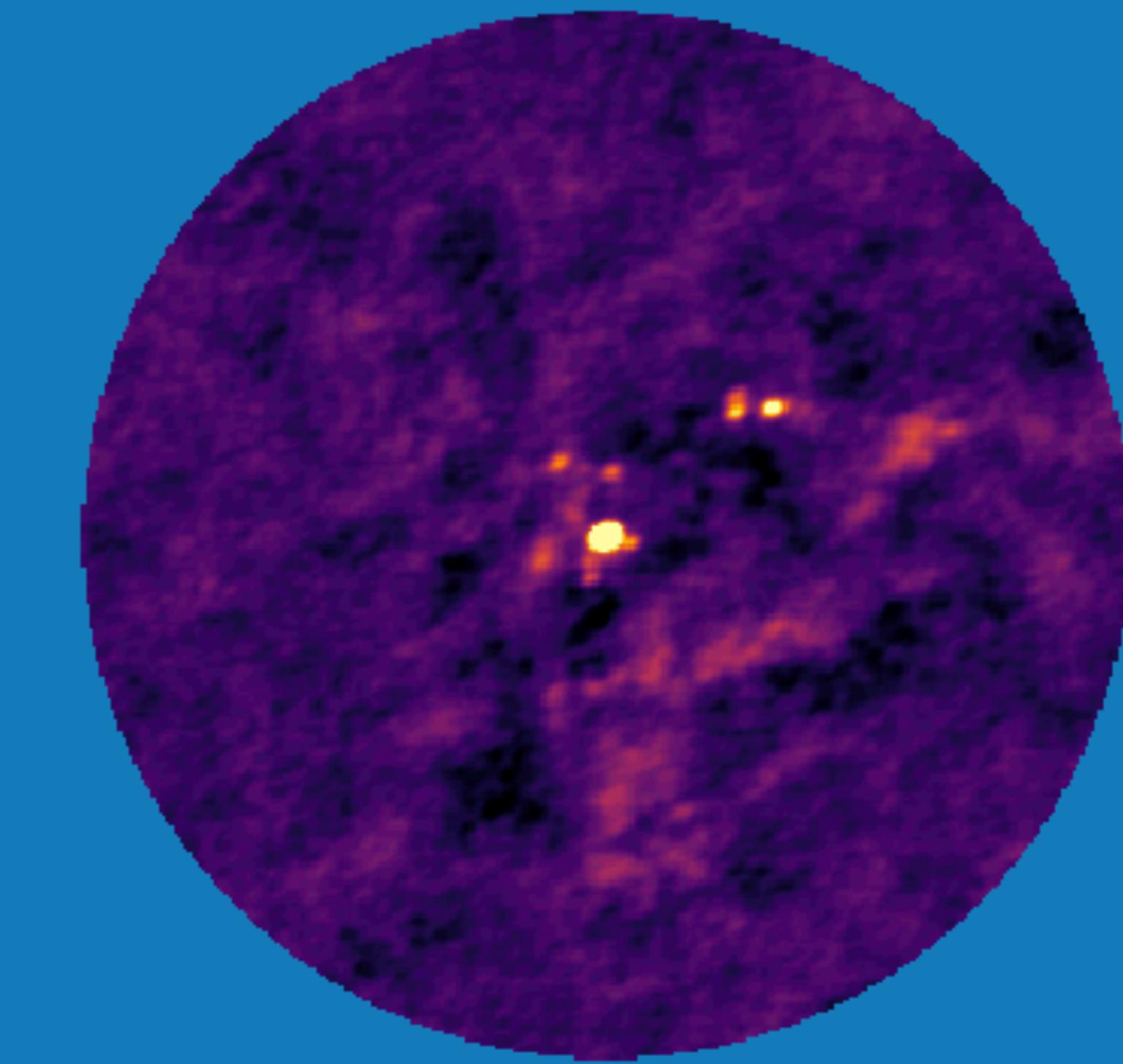
4

2

0

Right ascension

16



0.00043

0.00034

0.00025

0.00016

0.00007

-0.00002

WCS: (17:46:08.84, -28:42:55.5); Image: (334, 130); NaN ; Polarization: Stokes I

97 – 113 GHz

Declination
41:30
42:00
30
-28:43:00
30

20 18 16 14 12 10:46:10 08 06 04 02

Right ascension

0.00029
0.00021
0.00013
0.00005
0.00003
-0.00011
-0.00019

WCS: (17:46:00.95, -28:43:33.9); Image: (680, 2); Polarization: Stokes I

101 – 115 GHz

Declination

41:30

42:00

30

-28:43:00

30

⊕

20

18

16

14

12

17:46:10

08

06

04

02

Right ascension

0.000

0.0006

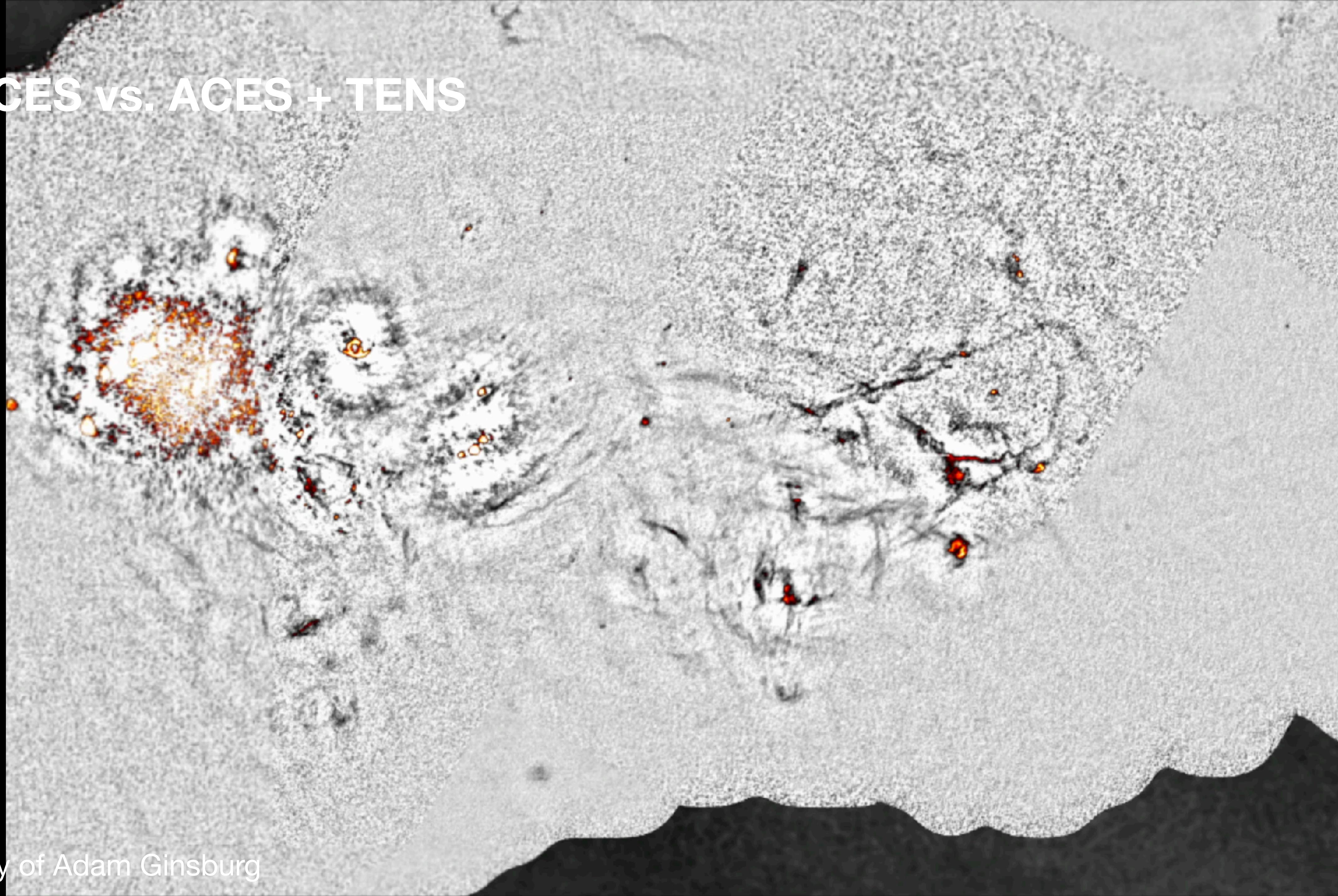
0.0004

0.0002

0.0000

-0.0002

ACES vs. ACES + TENS



MUSTANG-2
+ ACES

ACES 12-m only

