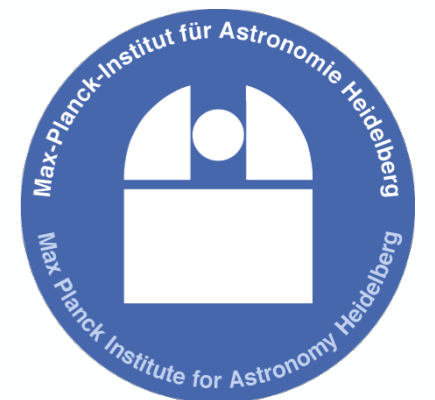


High-mass accretion disks - from Riccardo's beginnings to today

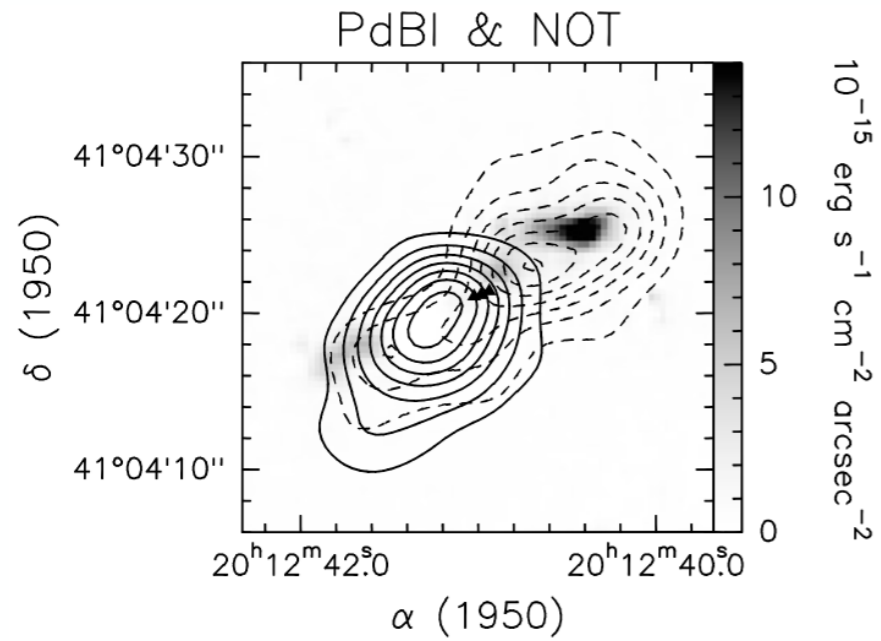
Henrik Beuther, MPIA

Riccardo-Fest @ Florence

May 6, 2026

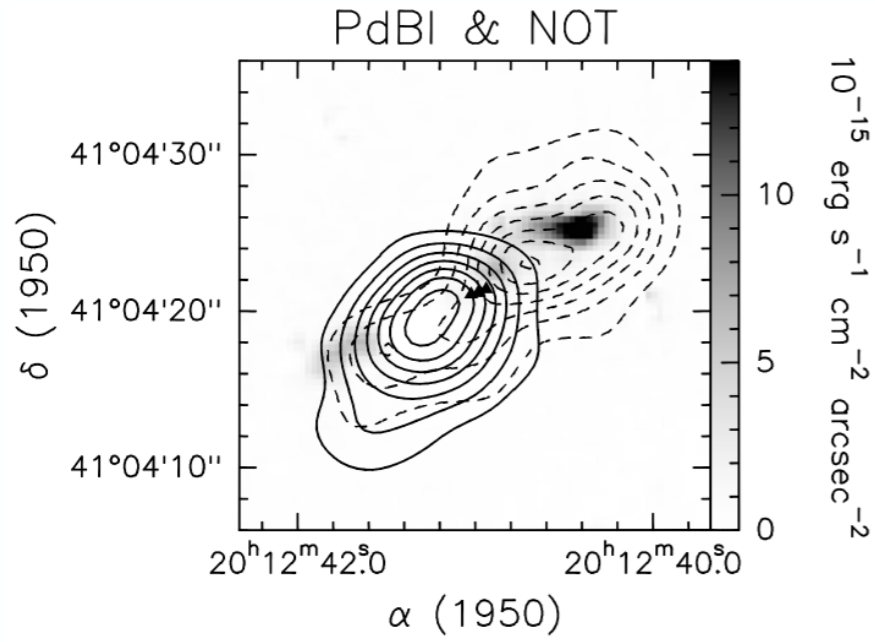


IRAS 20126+4104 - start 1997



Outflow

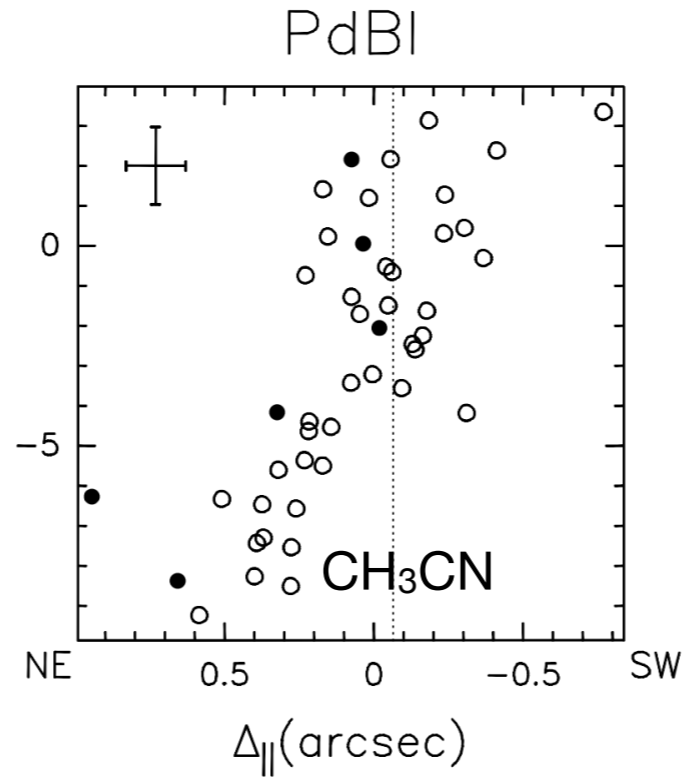
IRAS 20126+4104 - start 1997



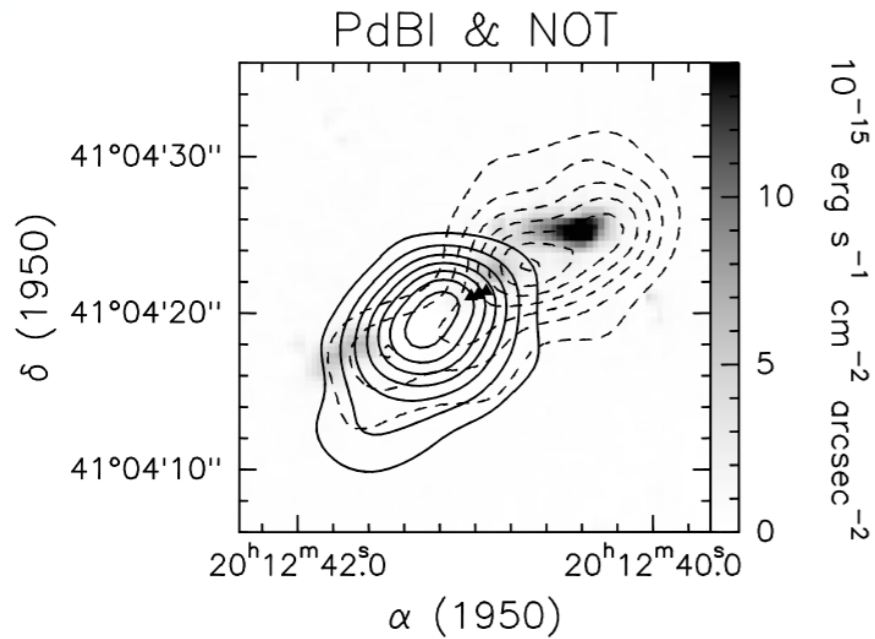
Outflow

Disk

V_{LSR} (km/s)



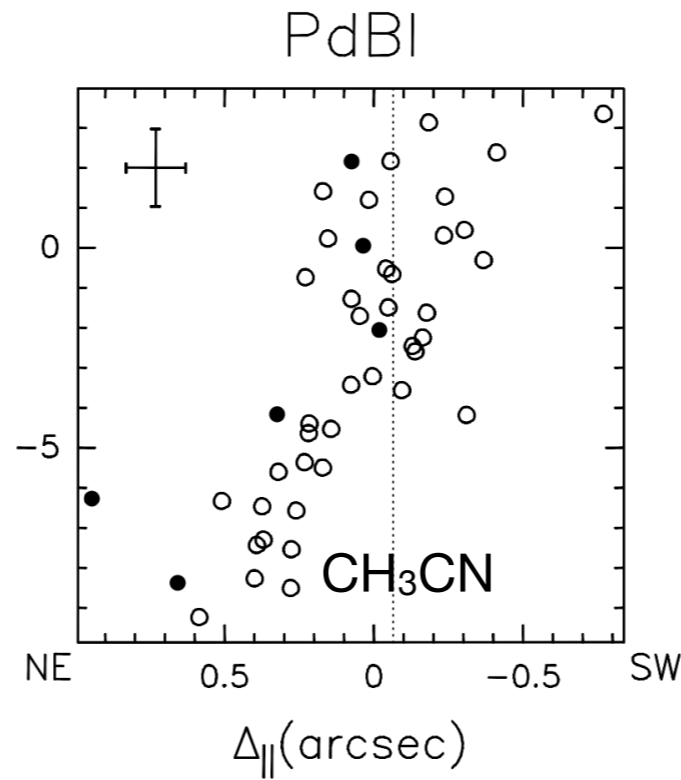
IRAS 20126+4104 - start 1997



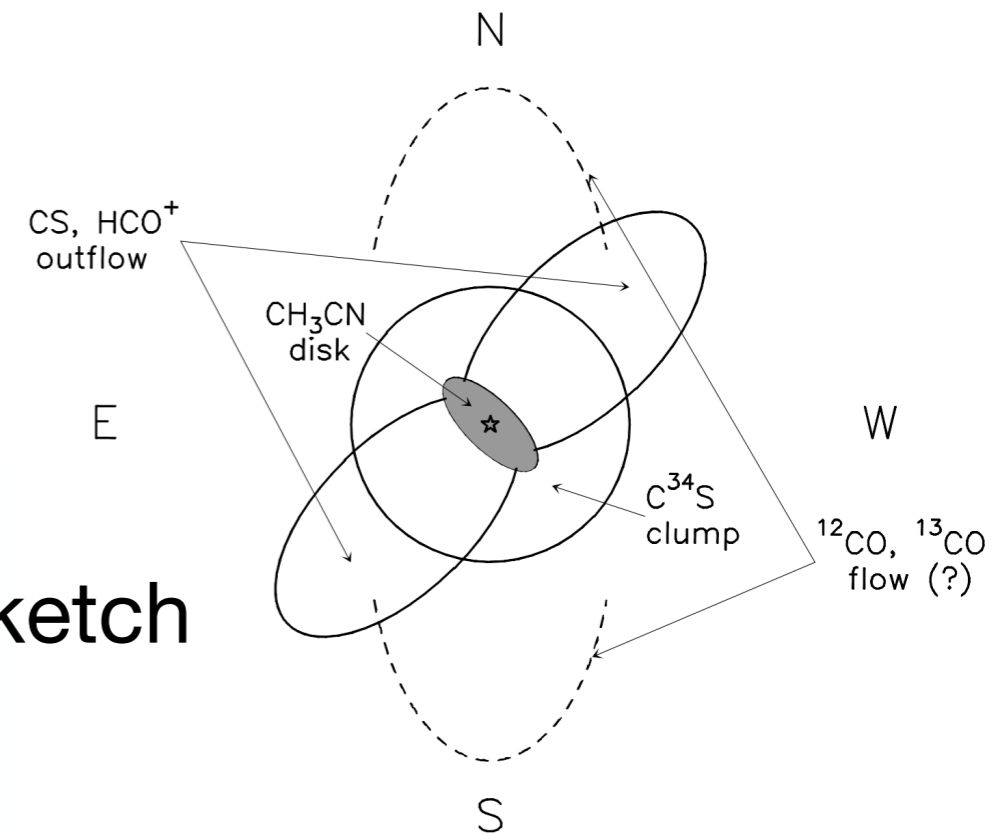
Outflow

Disk

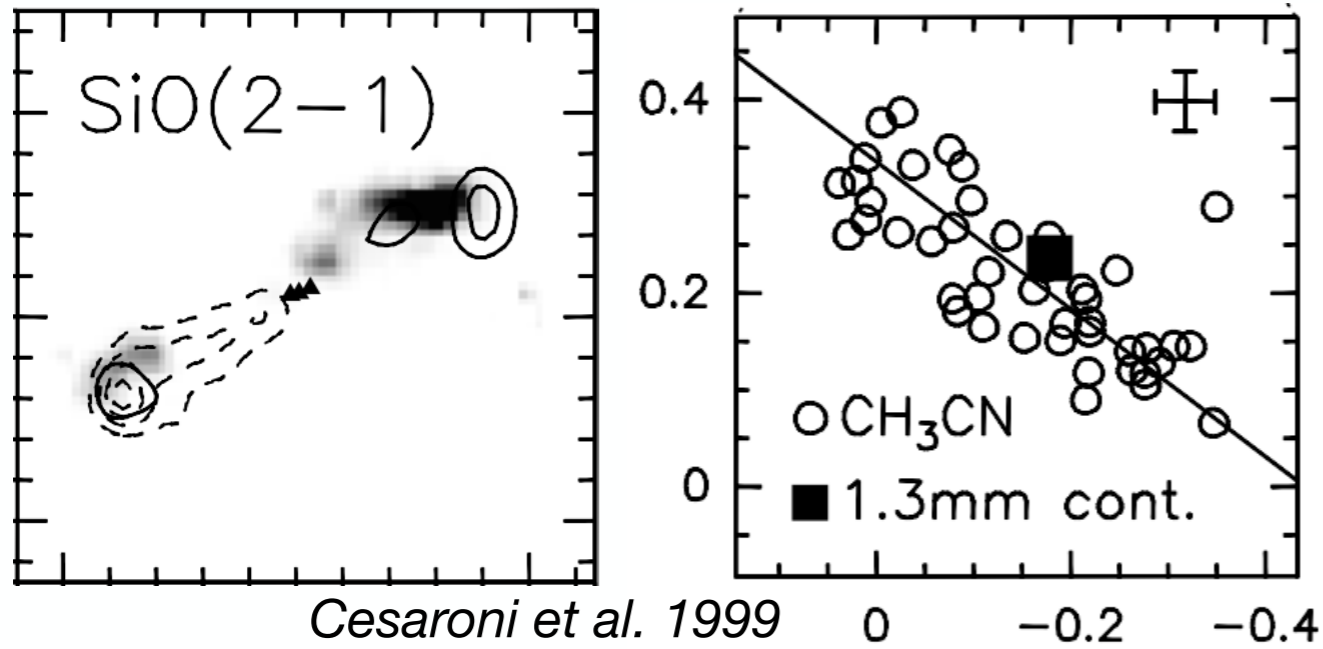
V_{LSR} (km/s)



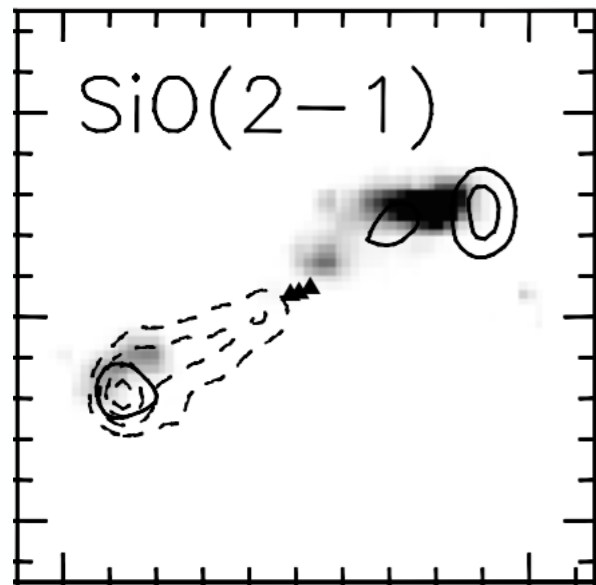
Sketch



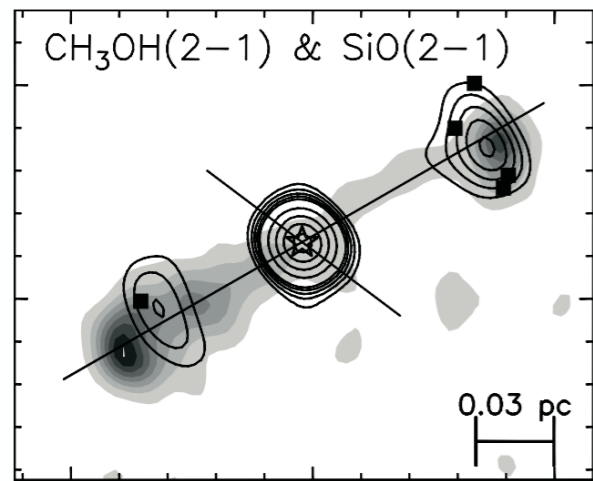
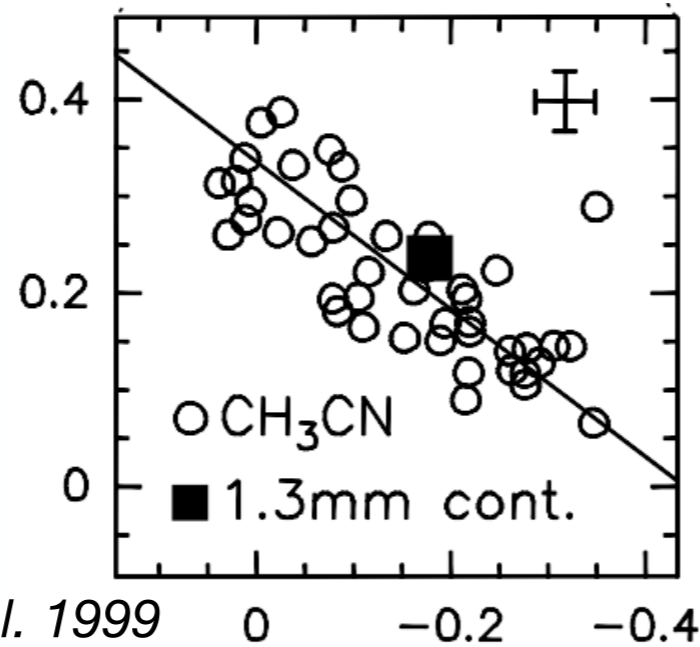
IRAS 20126+4104 - the story continues



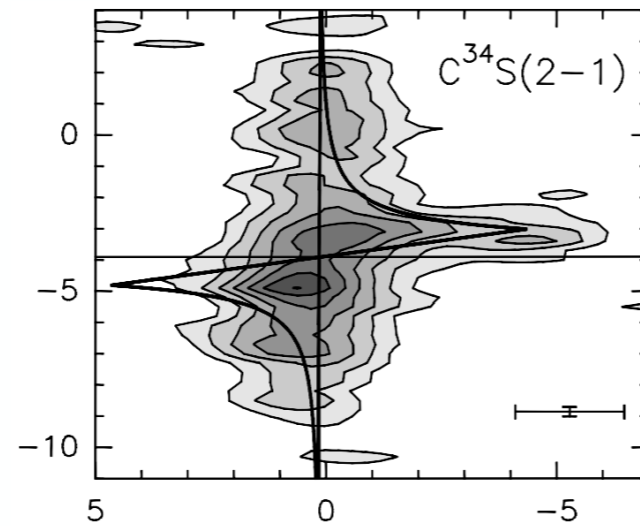
IRAS 20126+4104 - the story continues



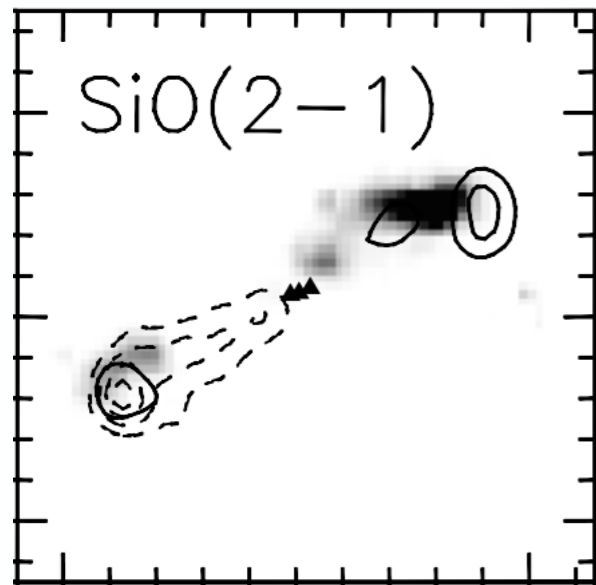
Cesaroni et al. 1999



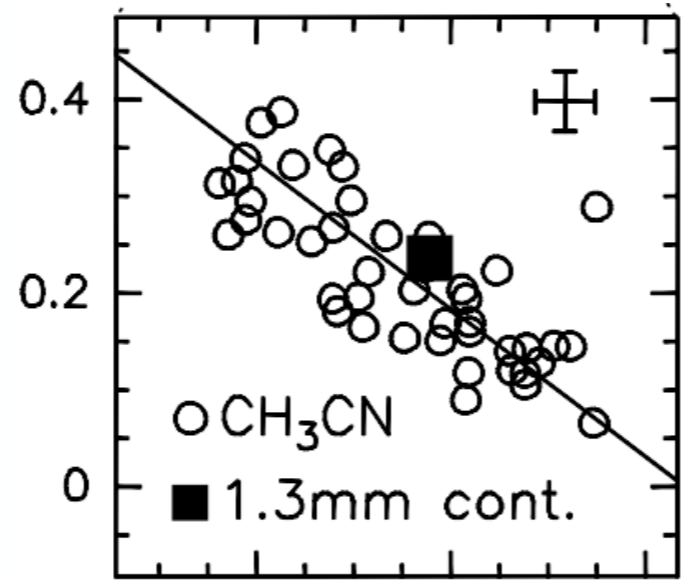
Cesaroni et al. 2005



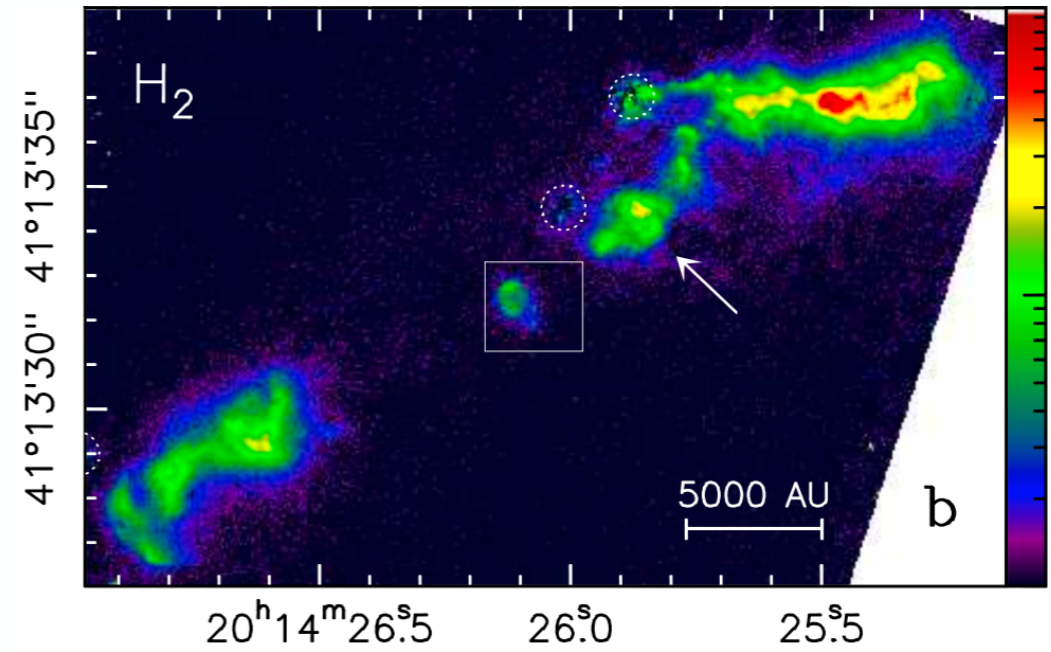
IRAS 20126+4104 - the story continues



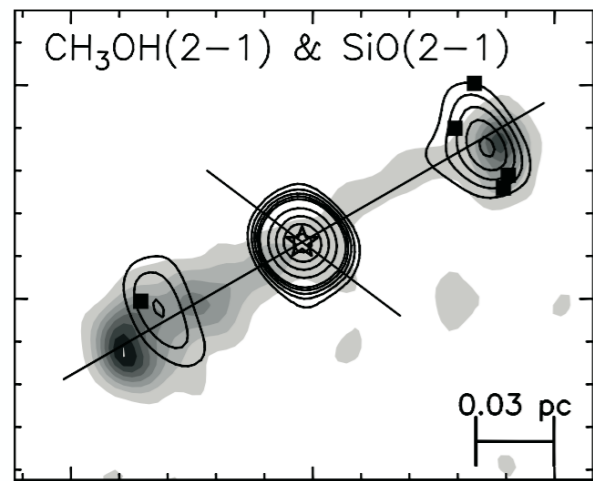
Cesaroni et al. 1999



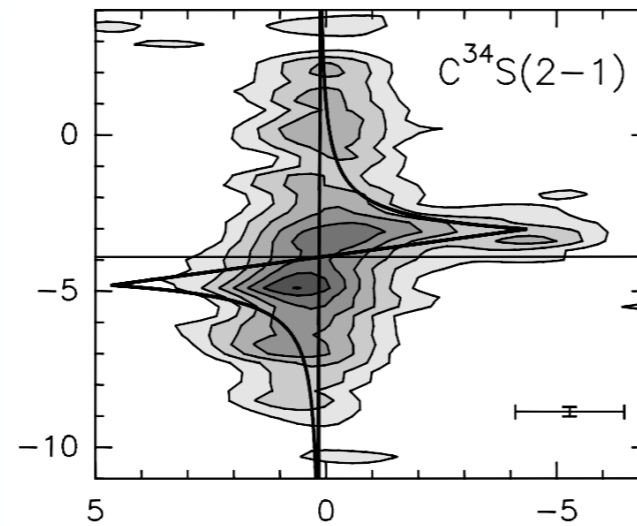
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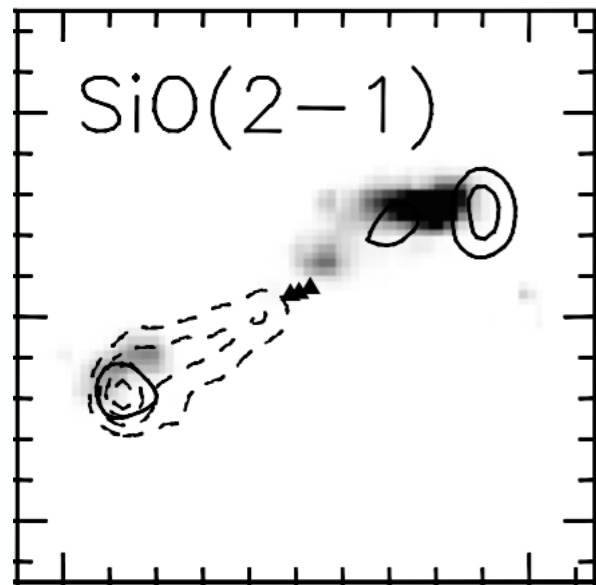
Cesaroni et al. 2013



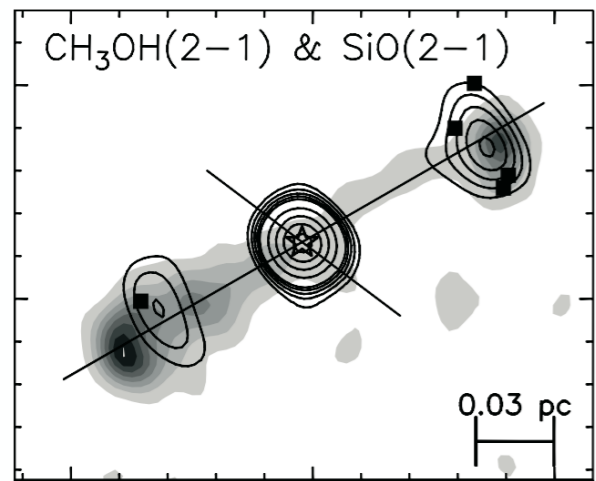
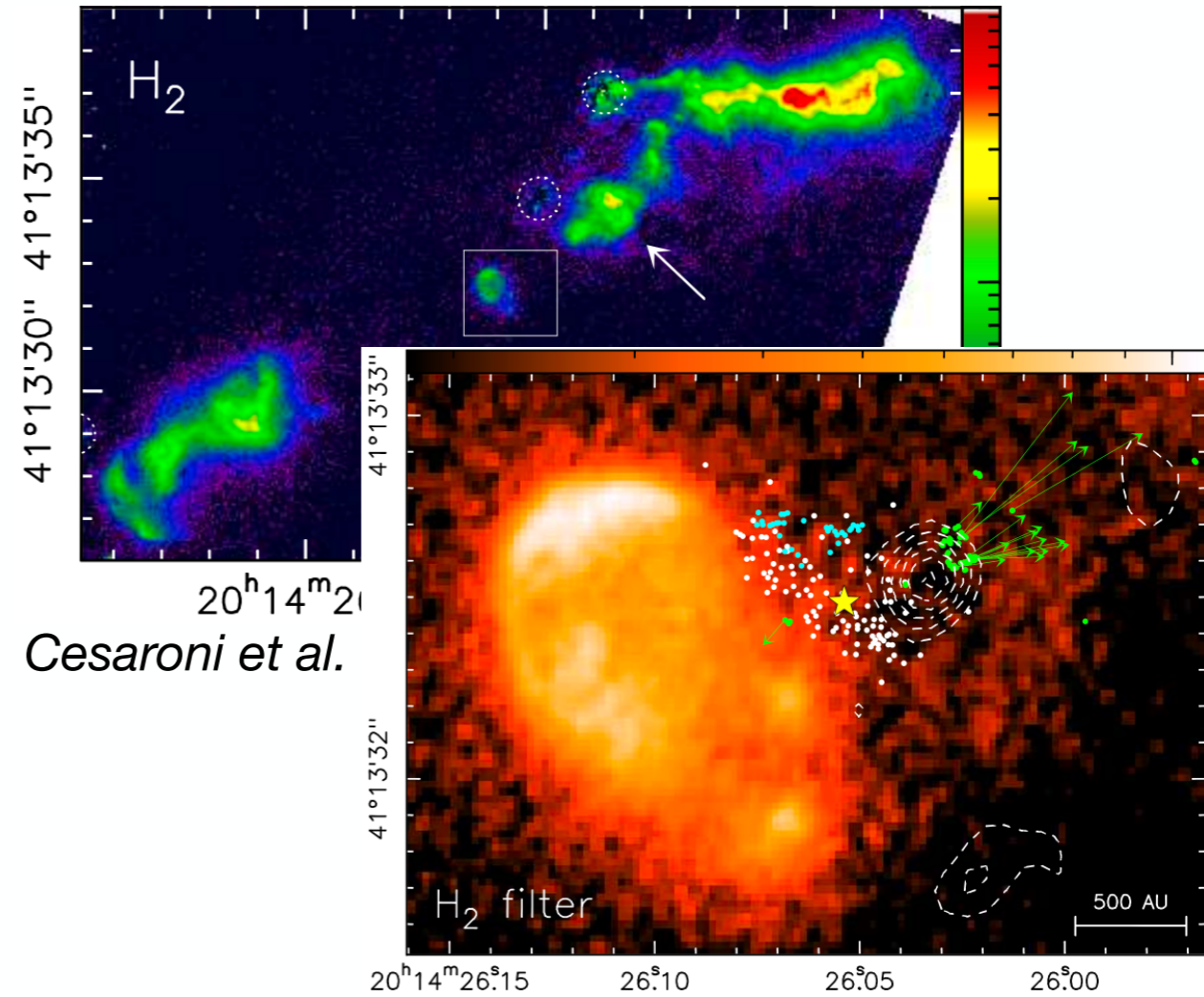
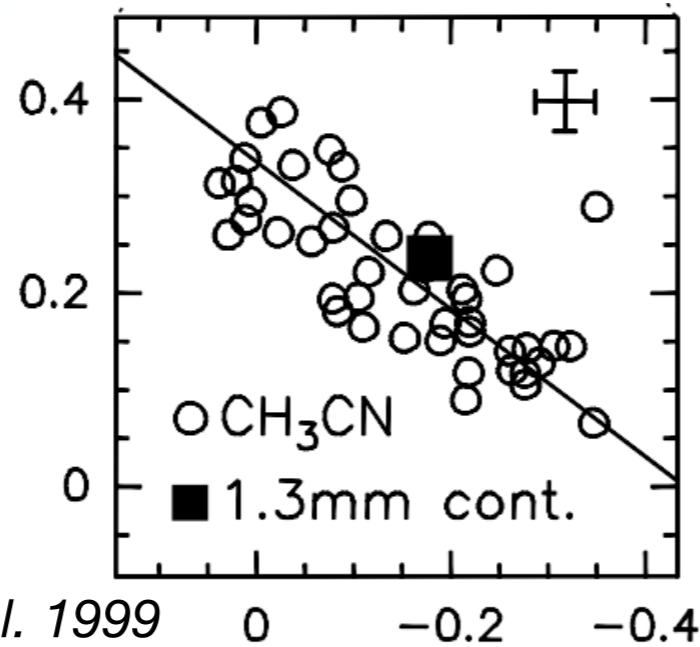
Cesaroni et al. 2005



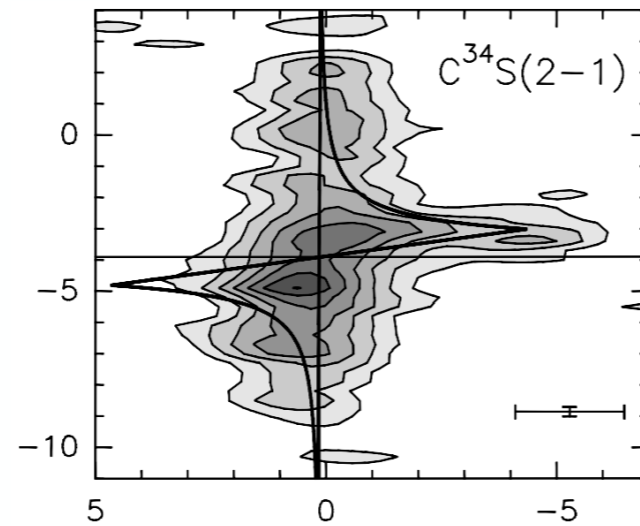
IRAS 20126+4104 - the story continues



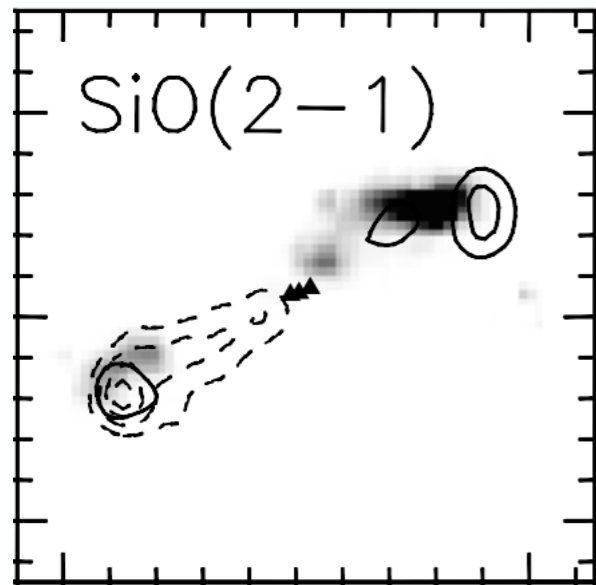
Cesaroni et al. 1999



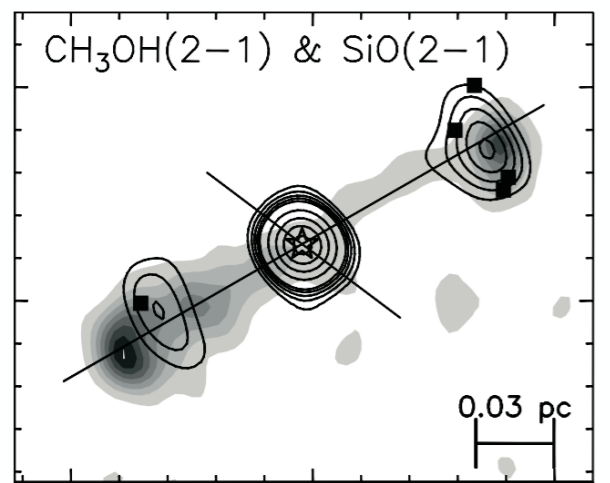
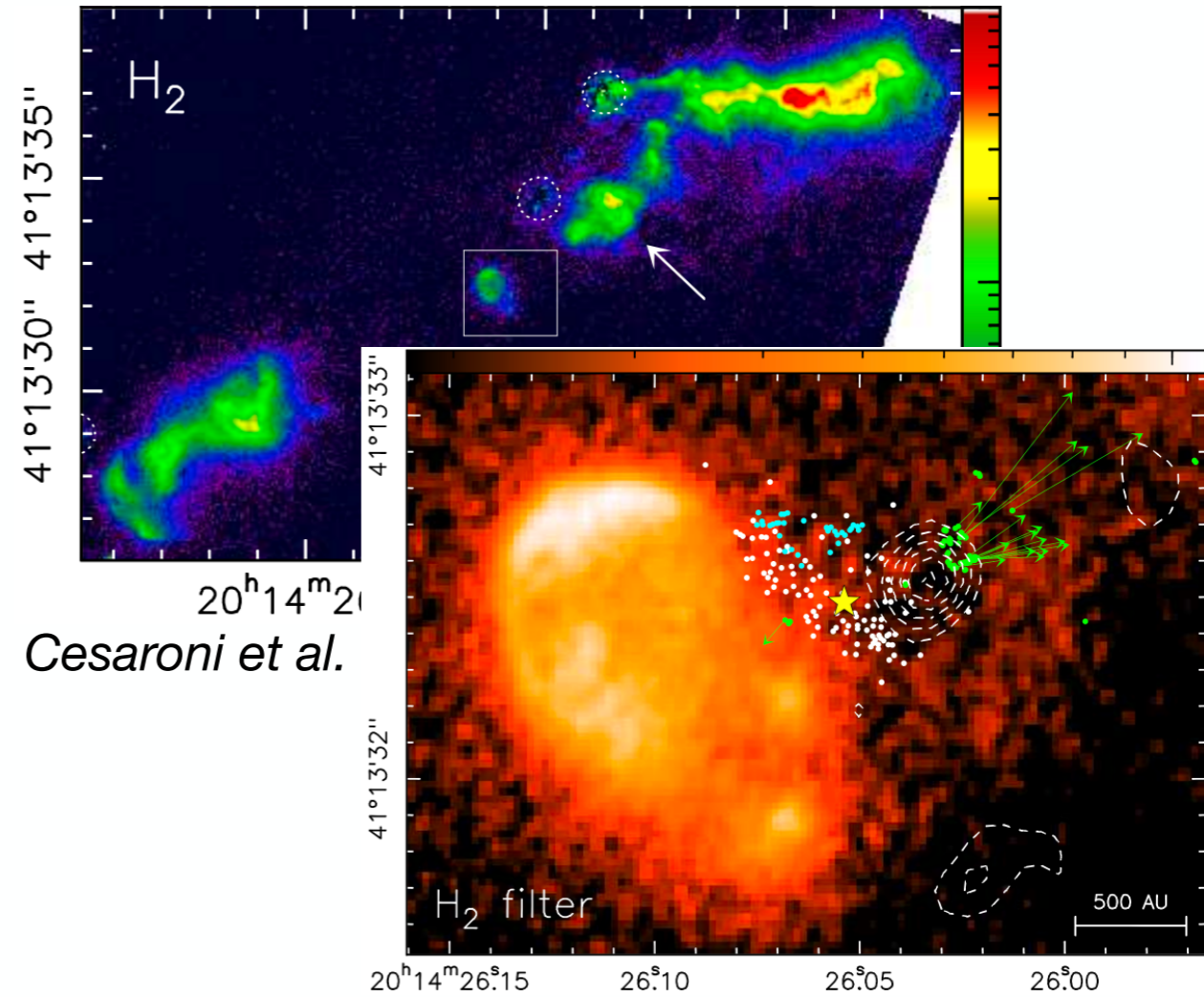
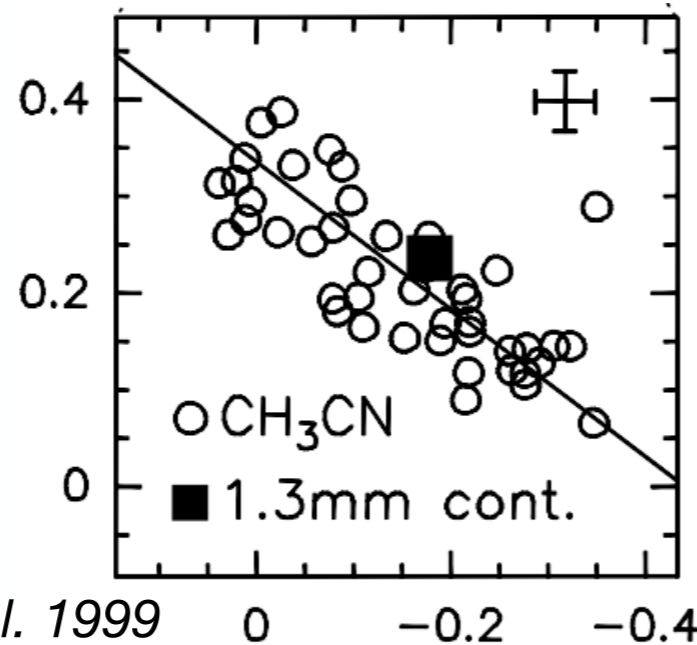
Cesaroni et al. 2005



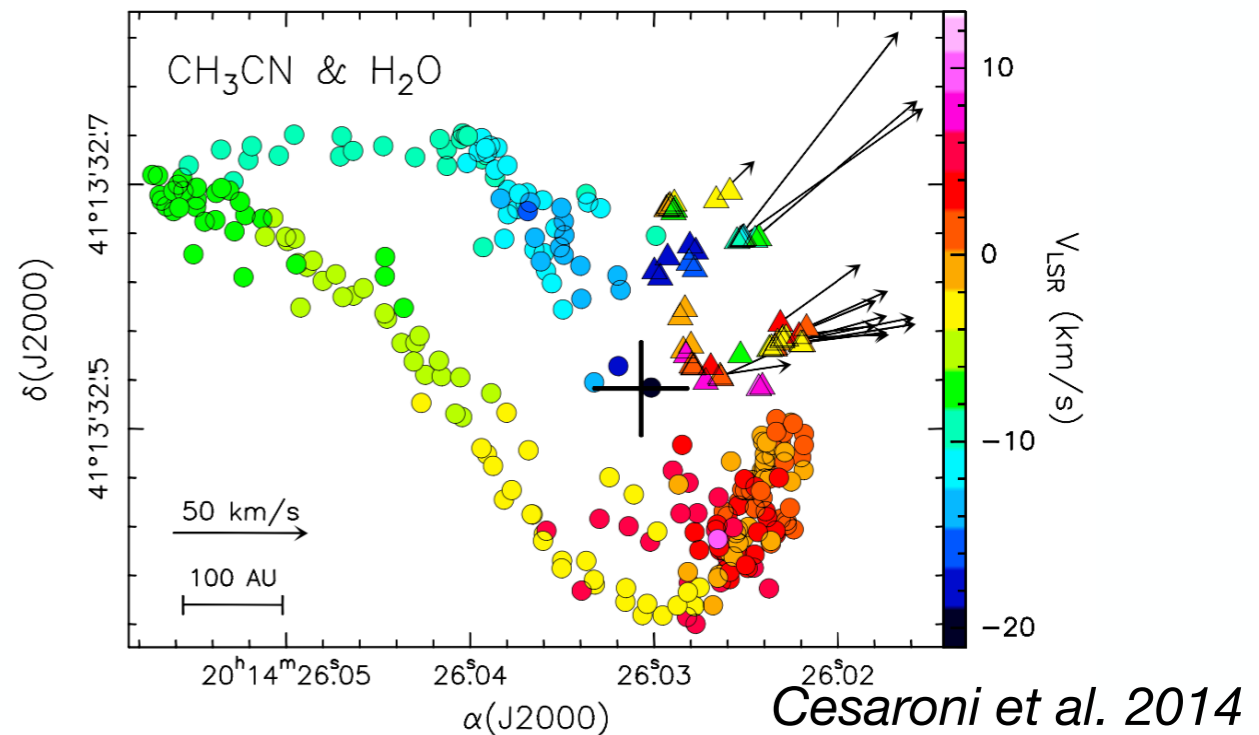
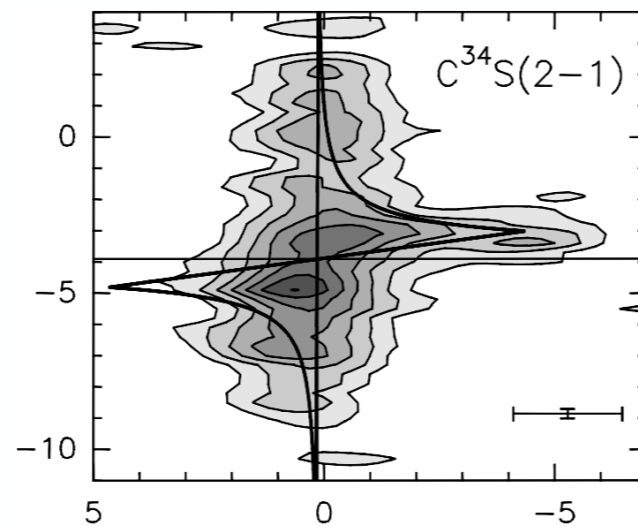
IRAS 20126+4104 - the story continues



Cesaroni et al. 1999

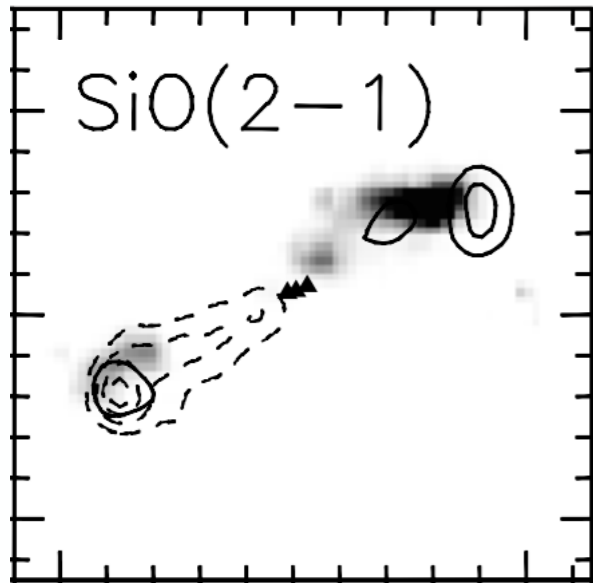


Cesaroni et al. 2005

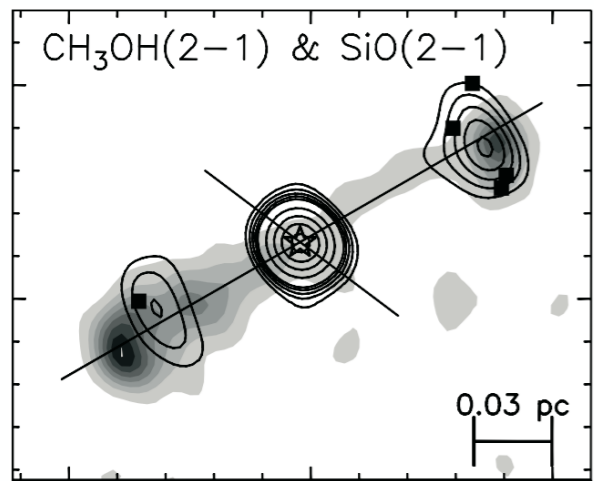
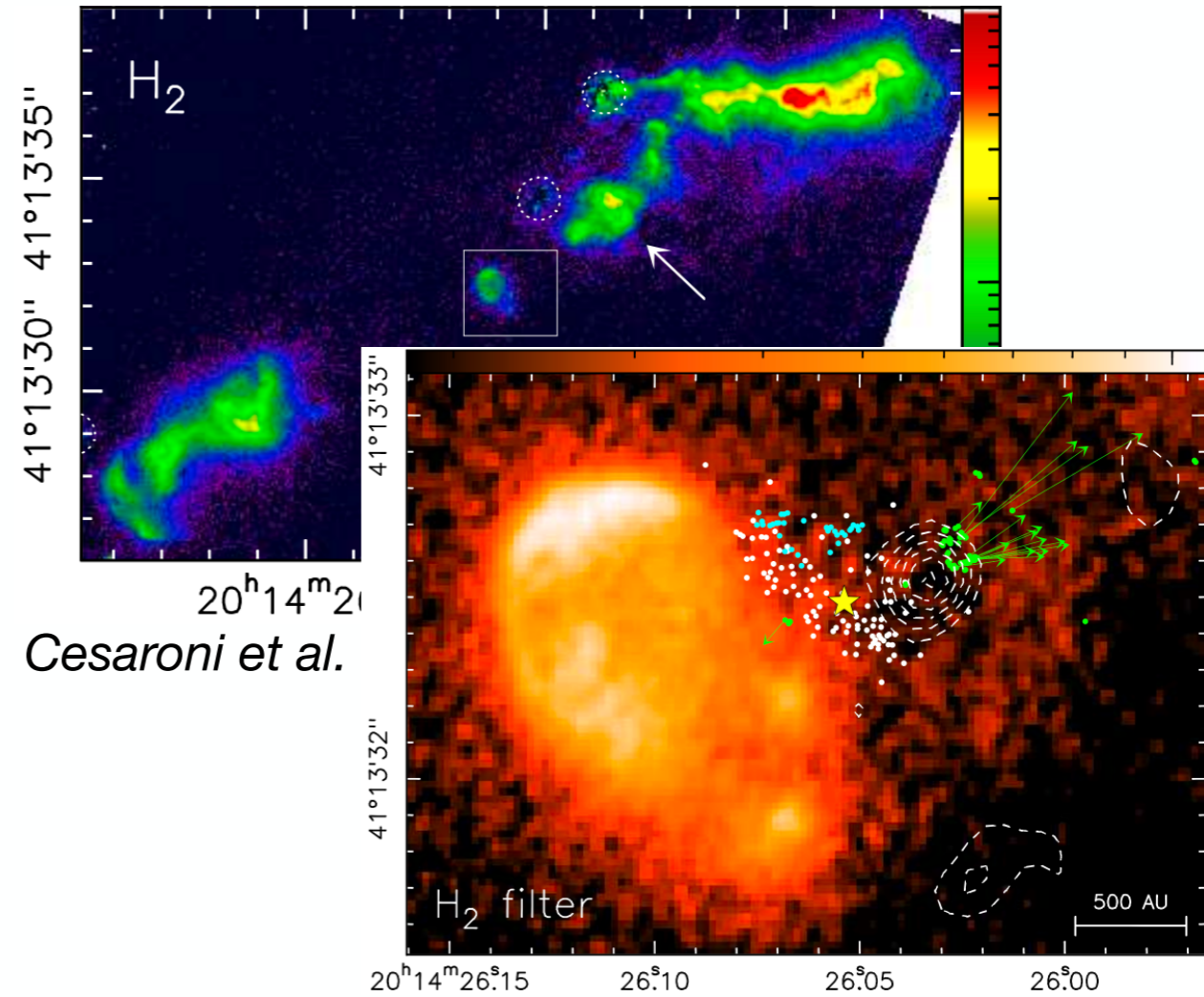
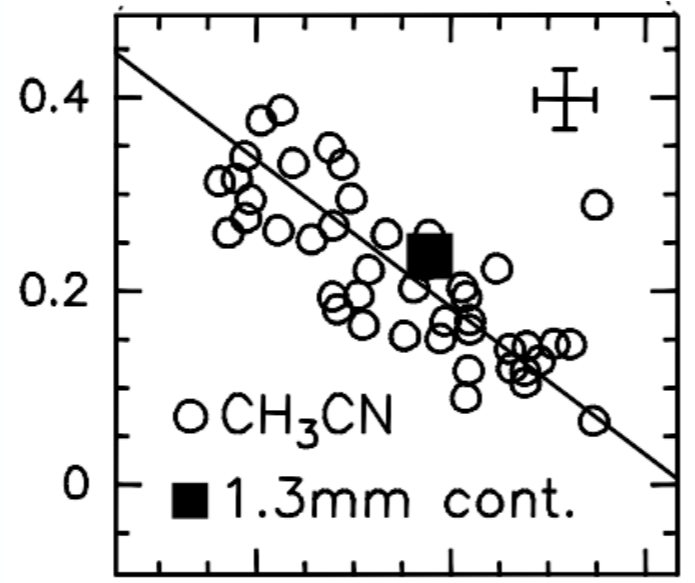


Cesaroni et al. 2014

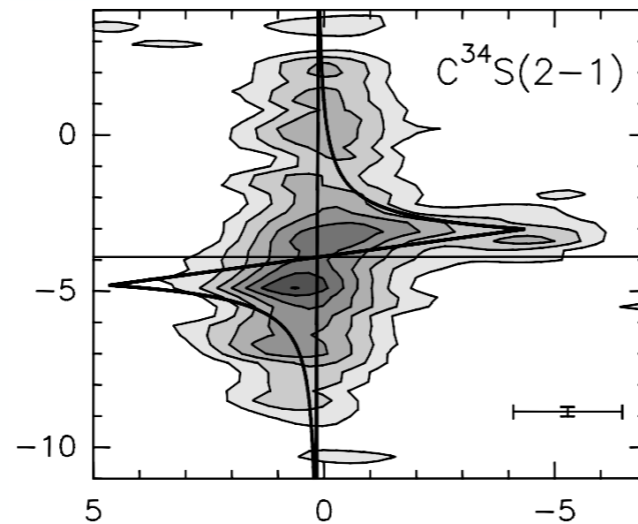
IRAS 20126+4104 - the story continues



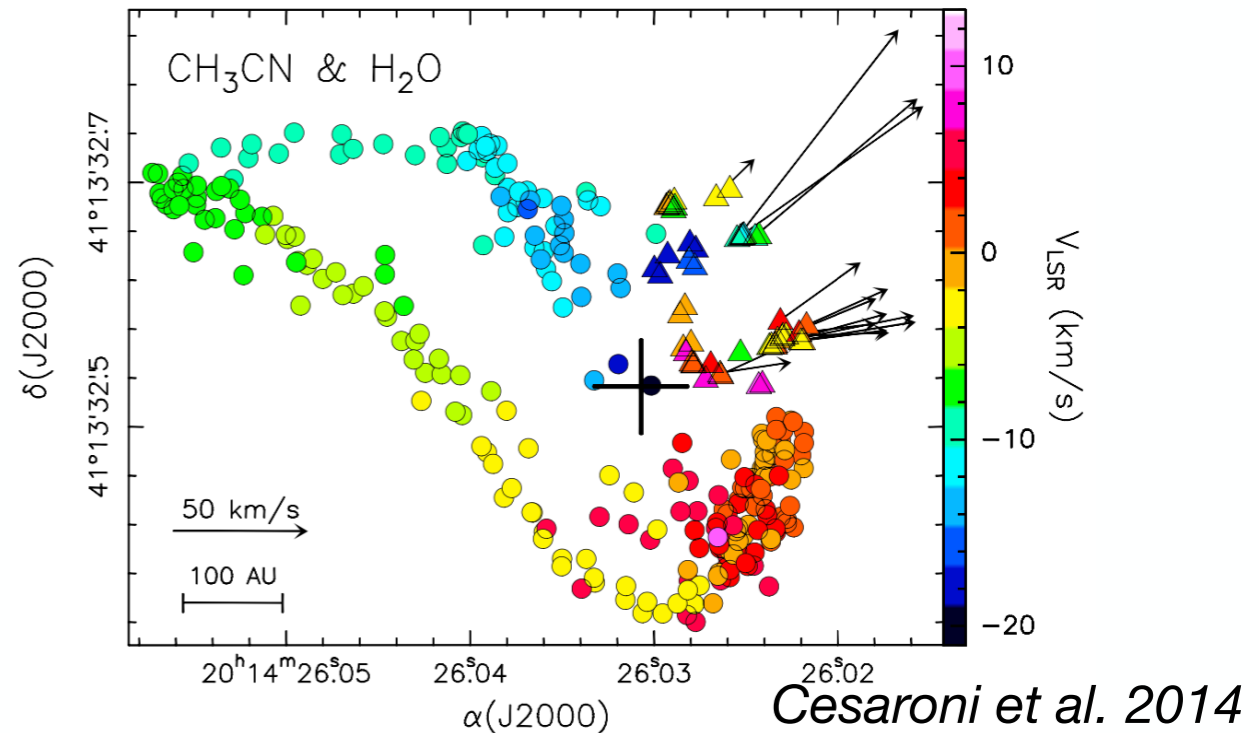
Cesaroni et al. 1999



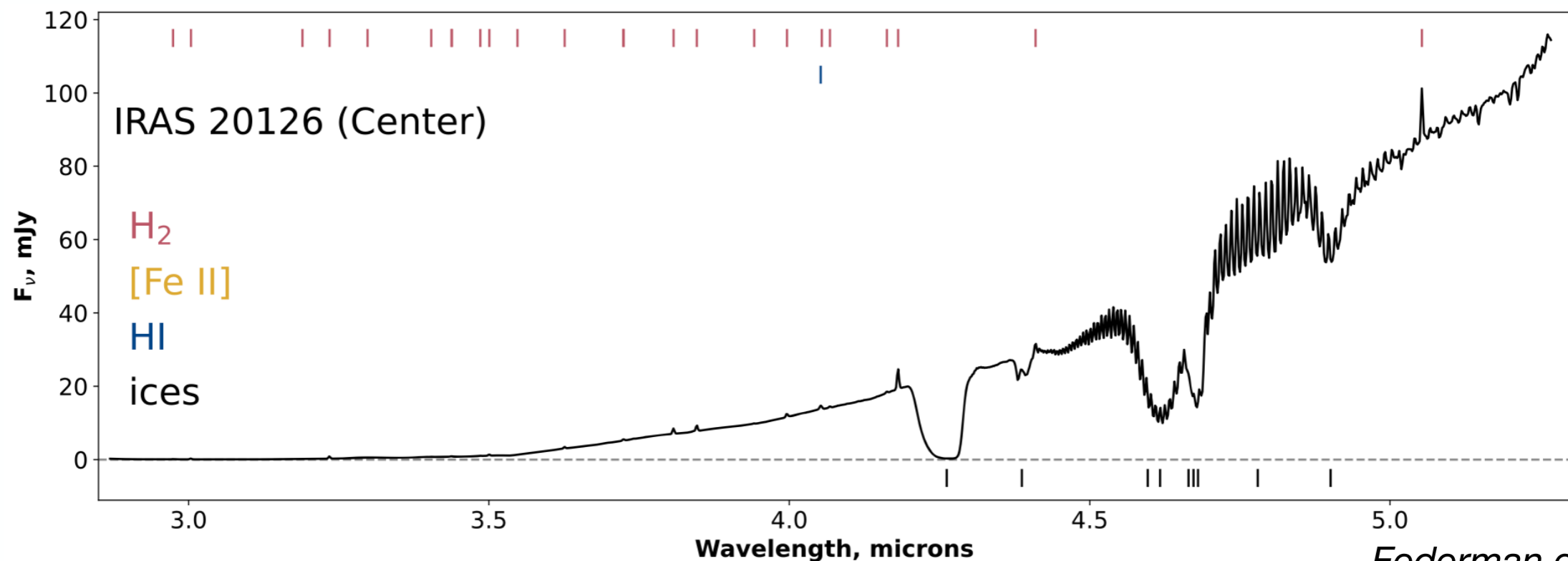
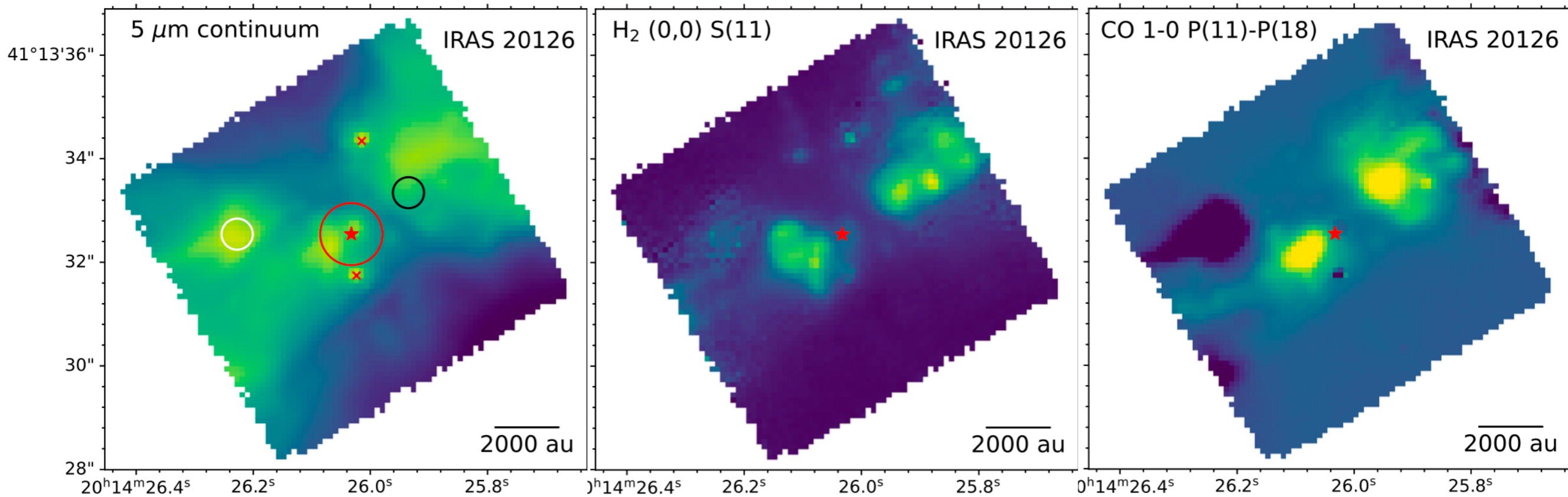
Cesaroni et al. 2005



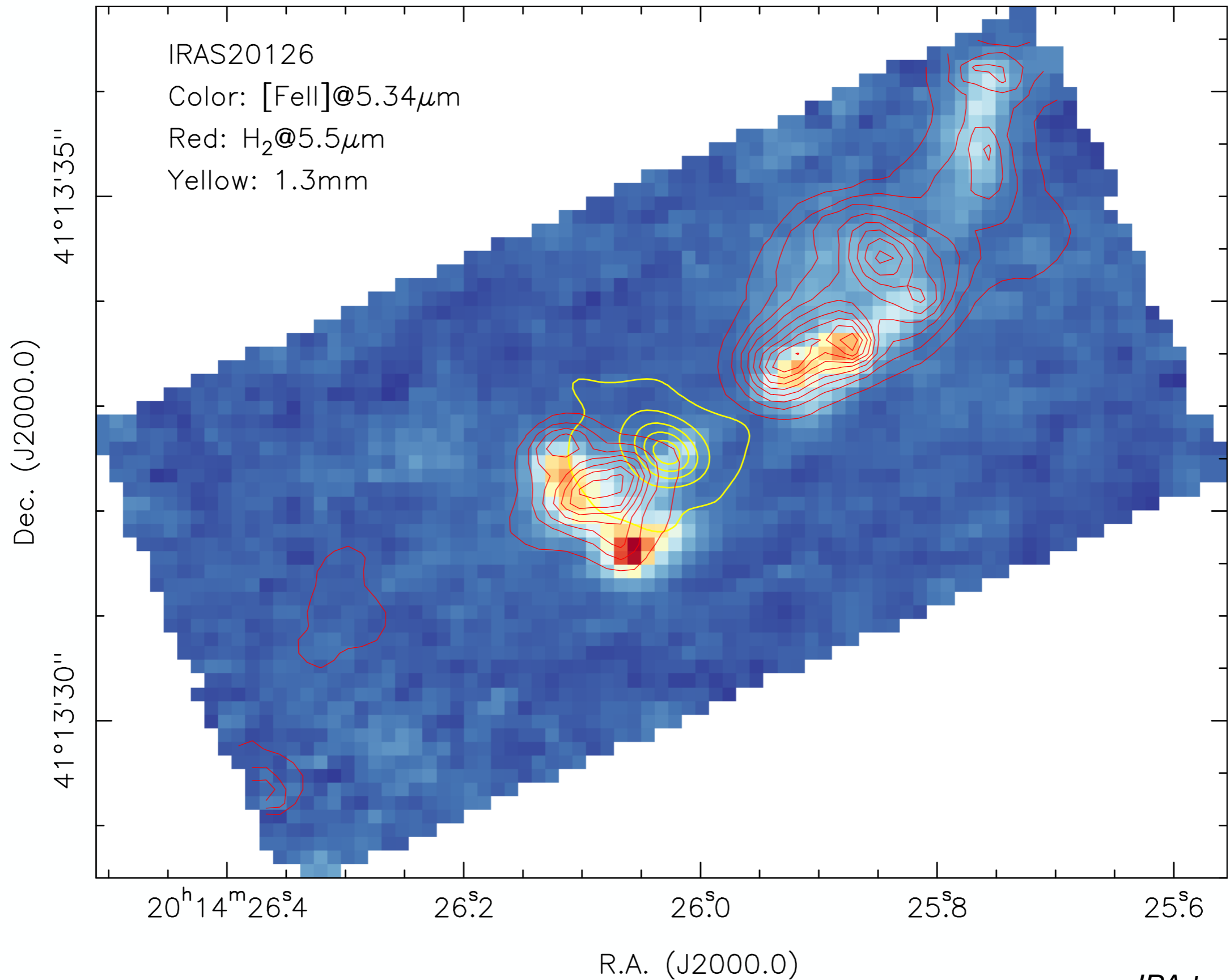
ALMA (Cesaroni et al. 2025)
 —> confirms & improves
 —> accretion rate 10⁻³ M_{sun}/yr



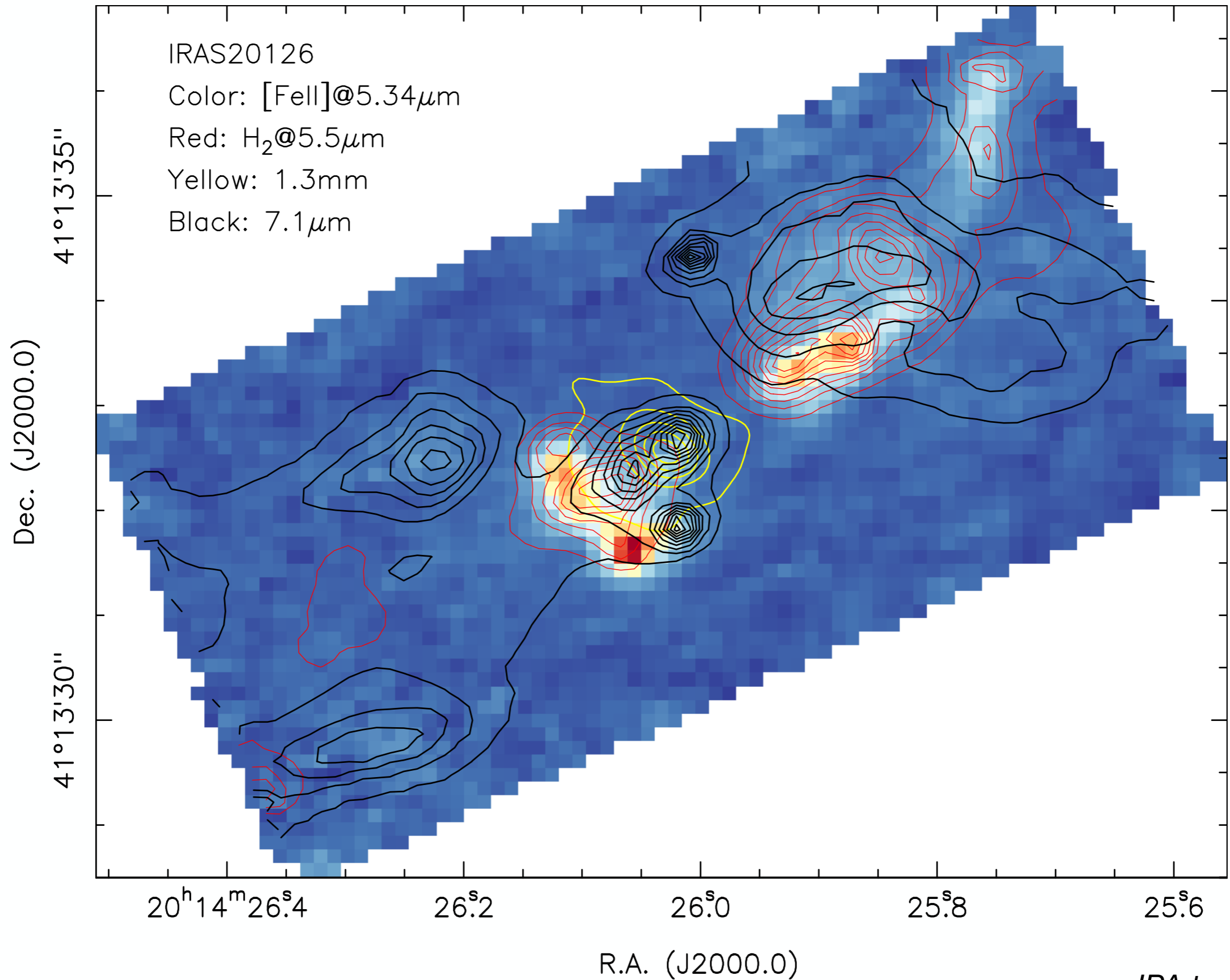
IRAS 20126+4104 - JWST - NIRSPEC



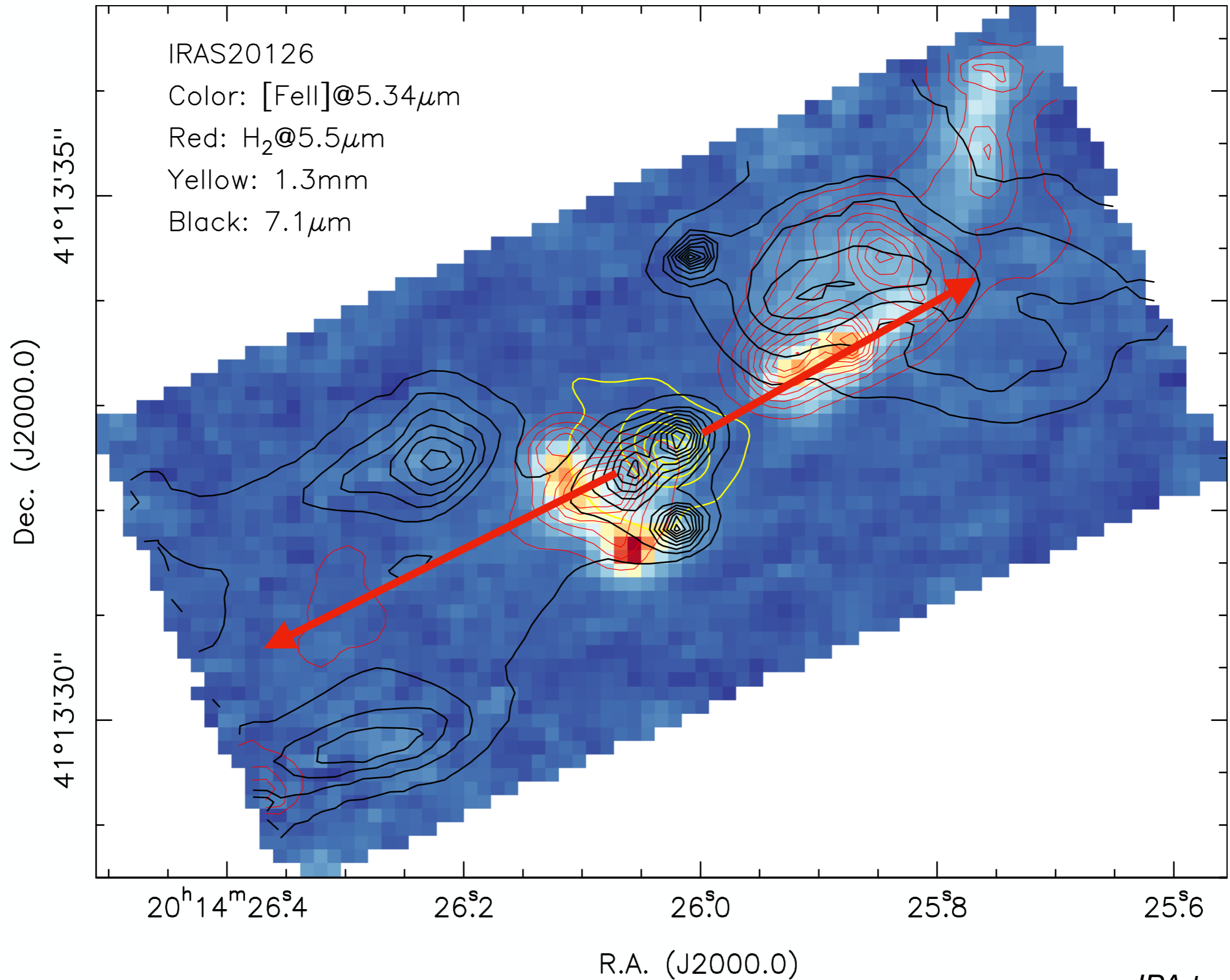
IRAS 20126+4104 - JWST - MIRI



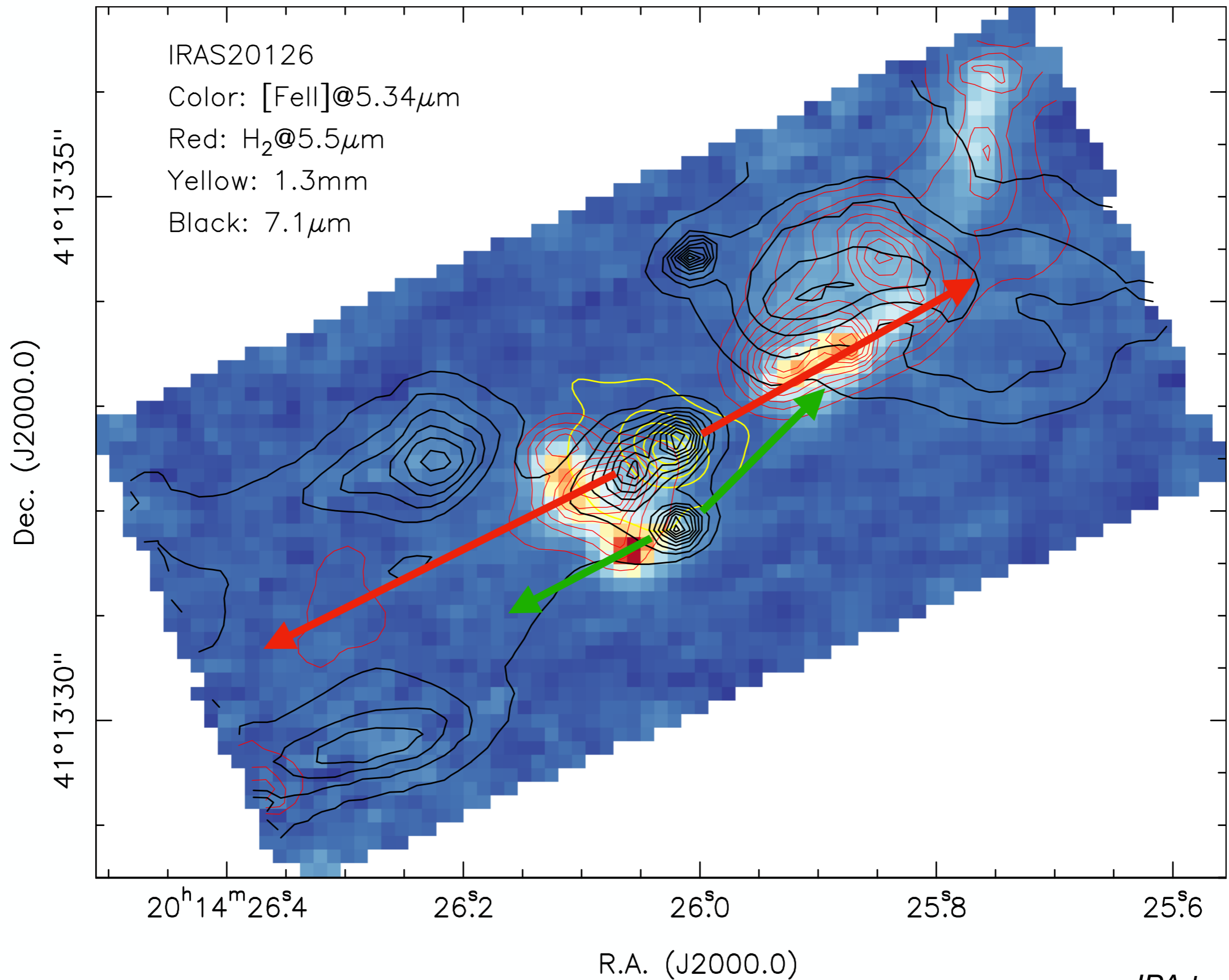
IRAS 20126+4104 - JWST - MIRI



IRAS 20126+4104 - JWST - MIRI

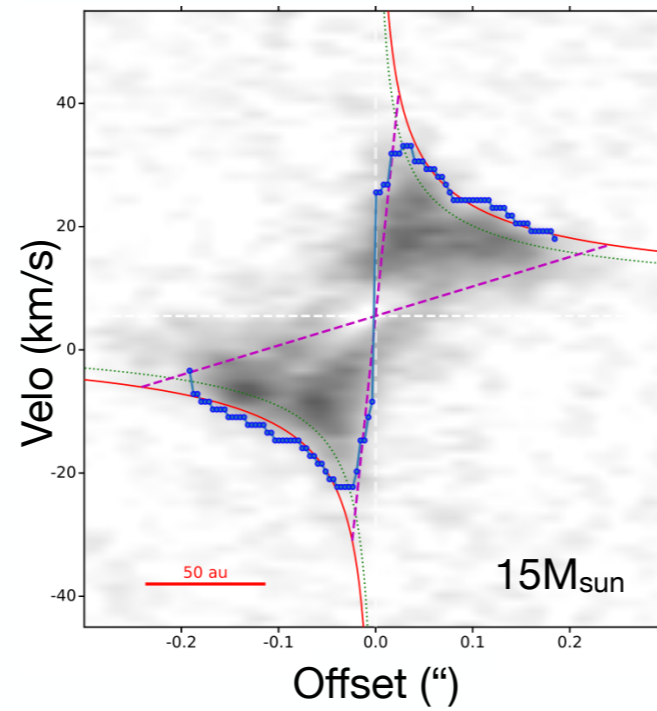
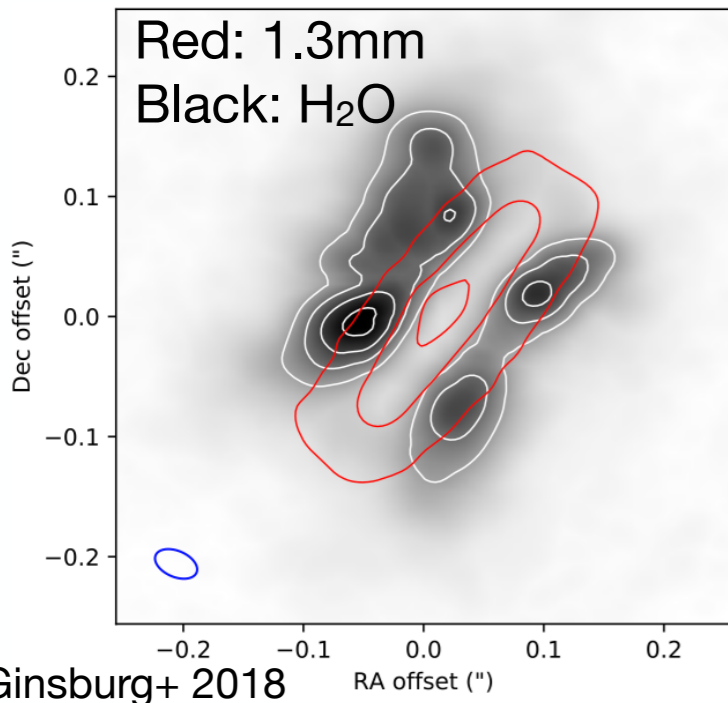


IRAS 20126+4104 - JWST - MIRI



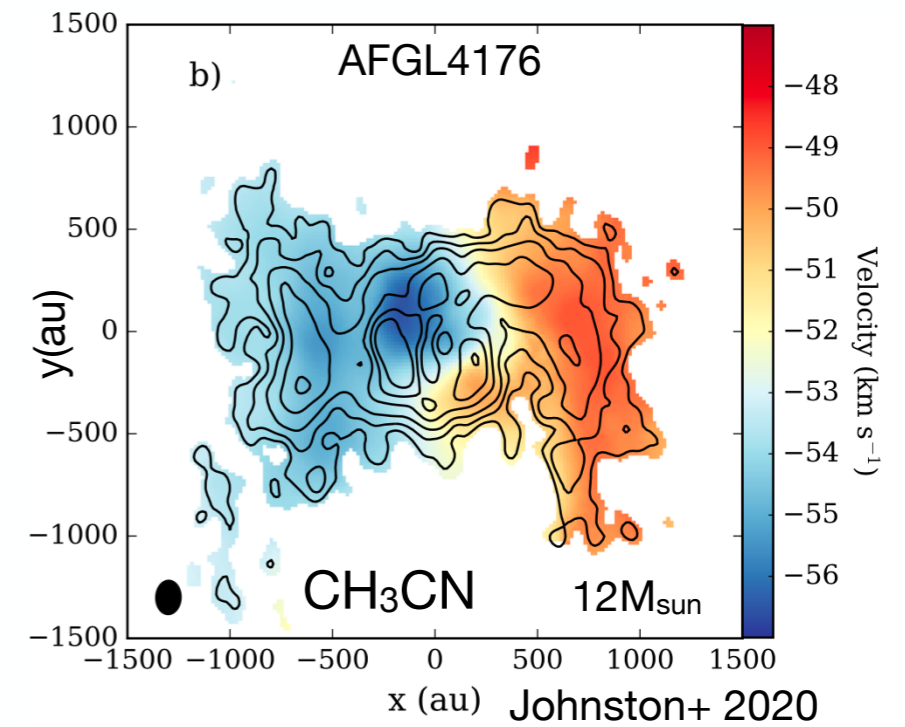
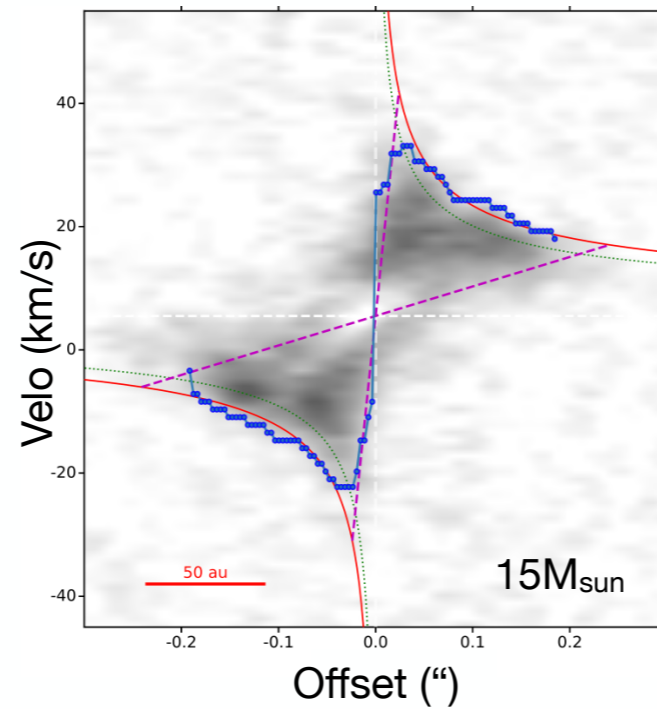
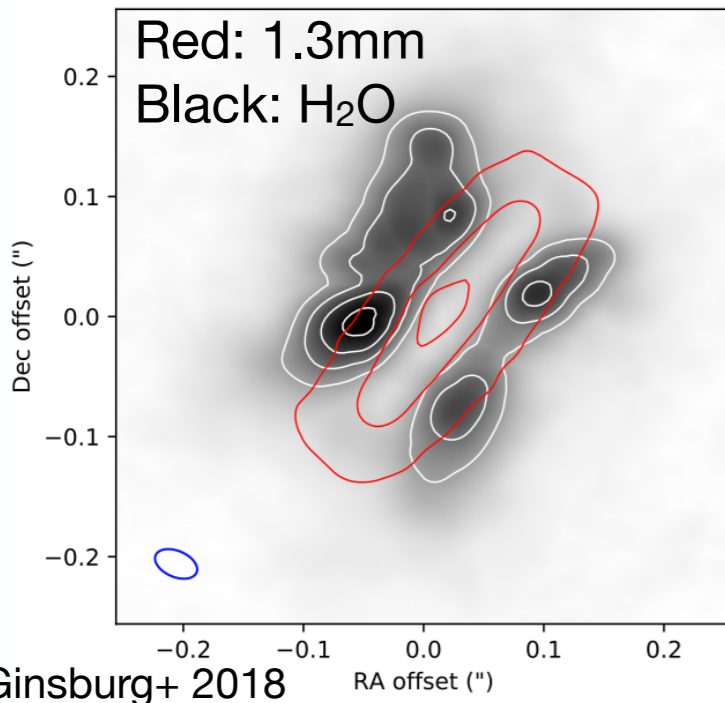
Some recent high-mass disk examples

Orion source I



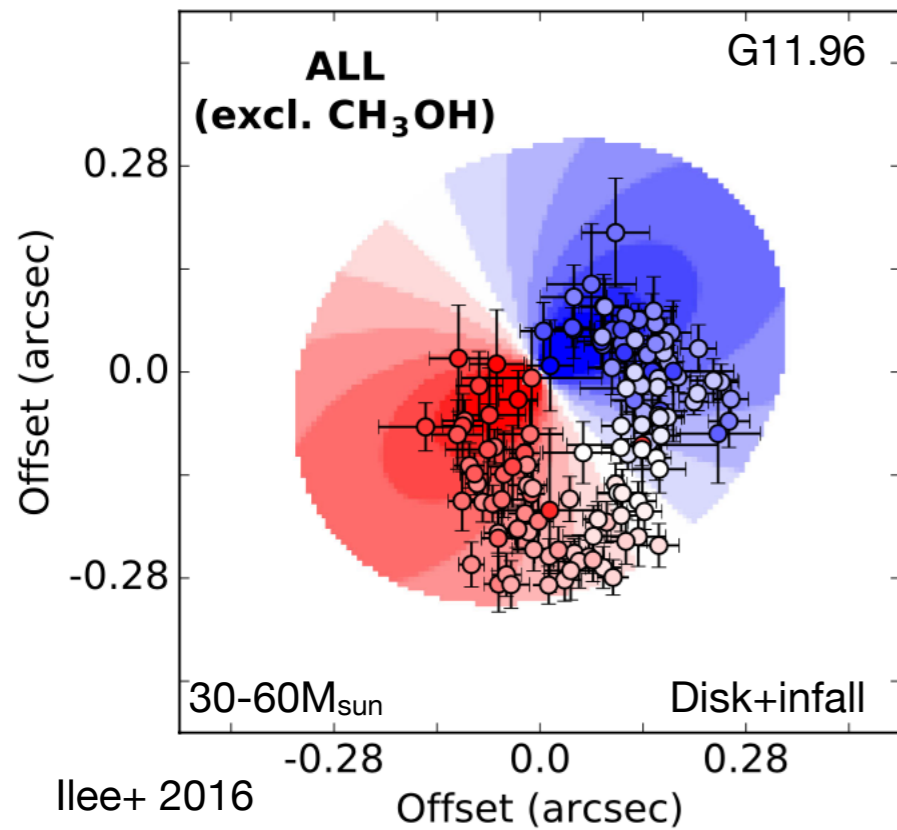
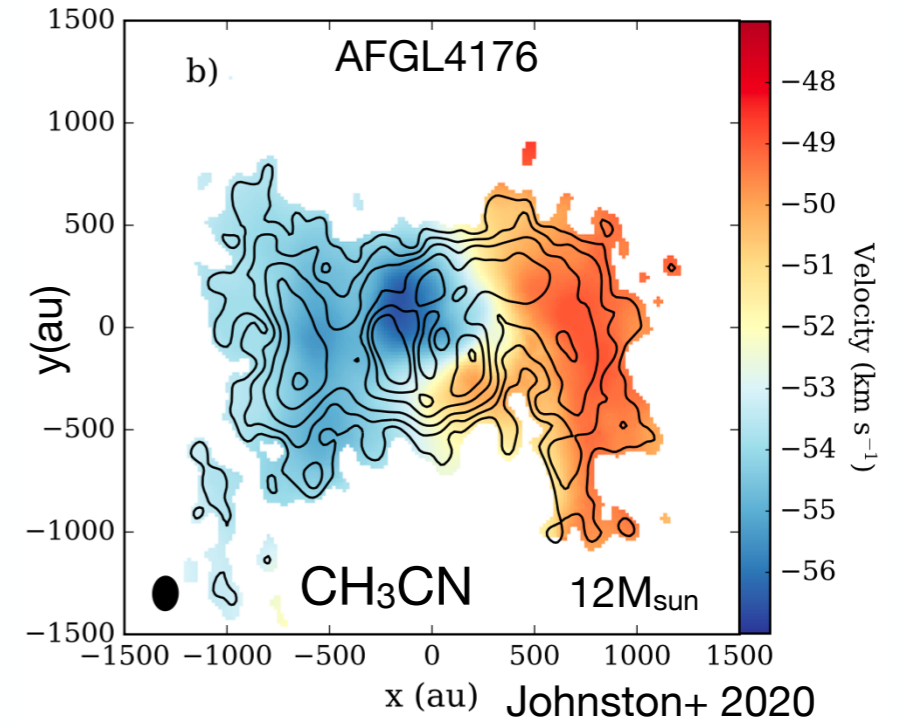
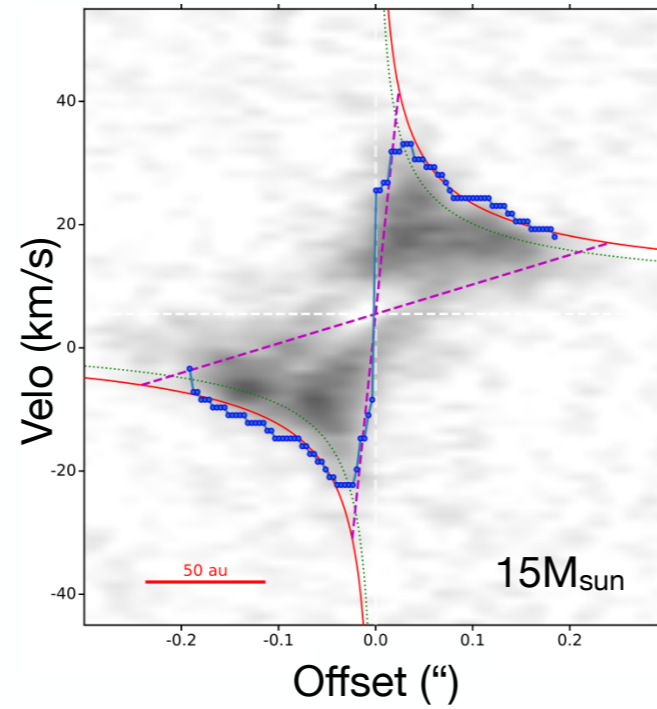
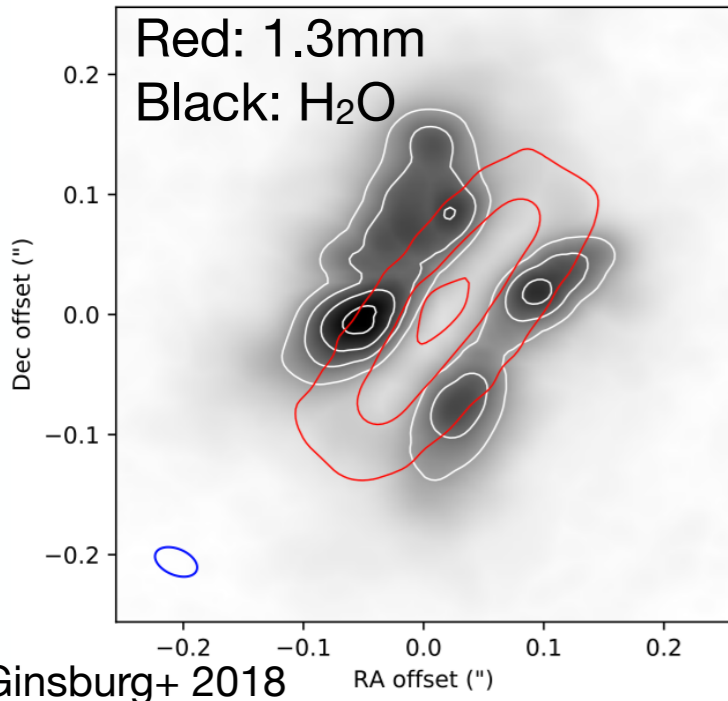
Some recent high-mass disk examples

Orion source I



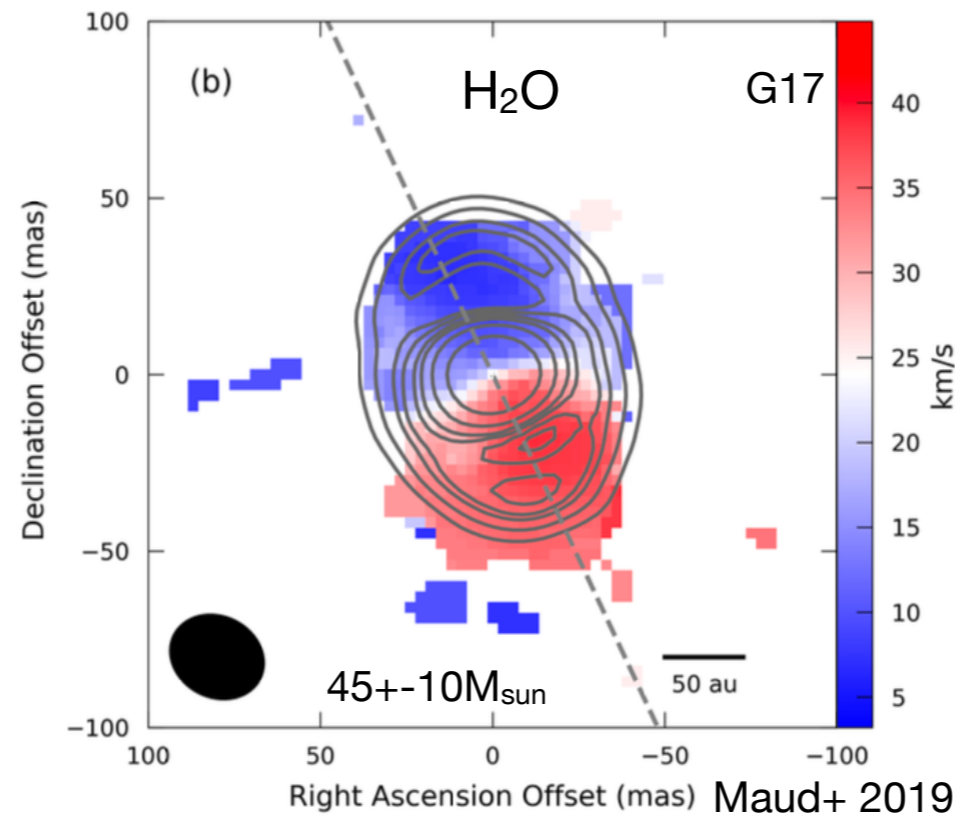
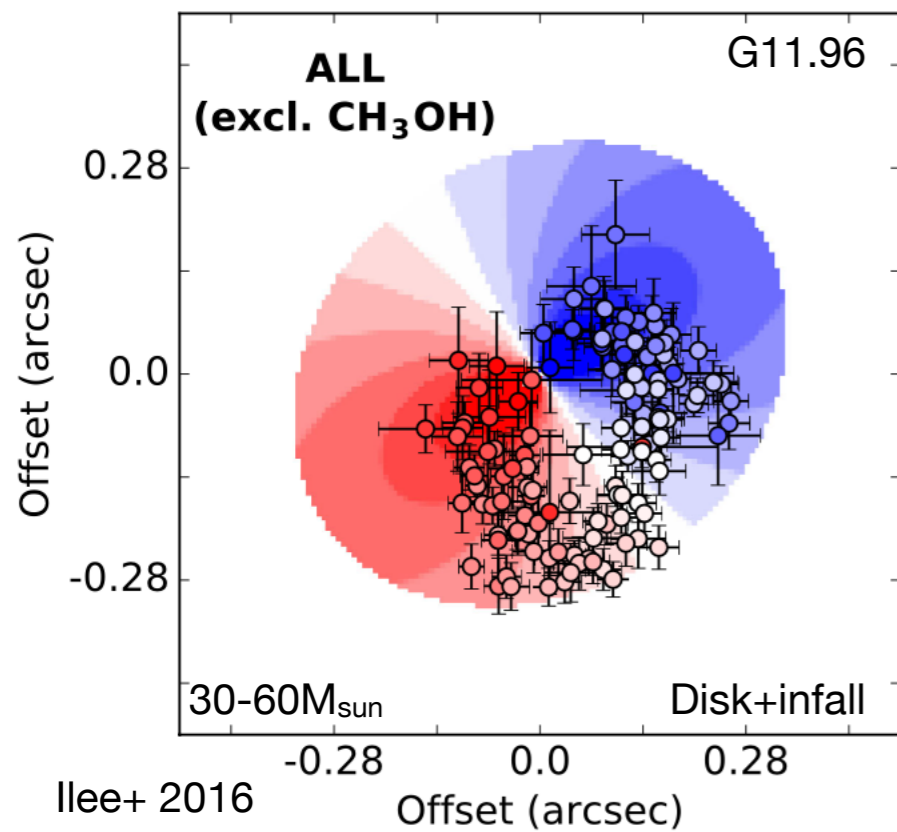
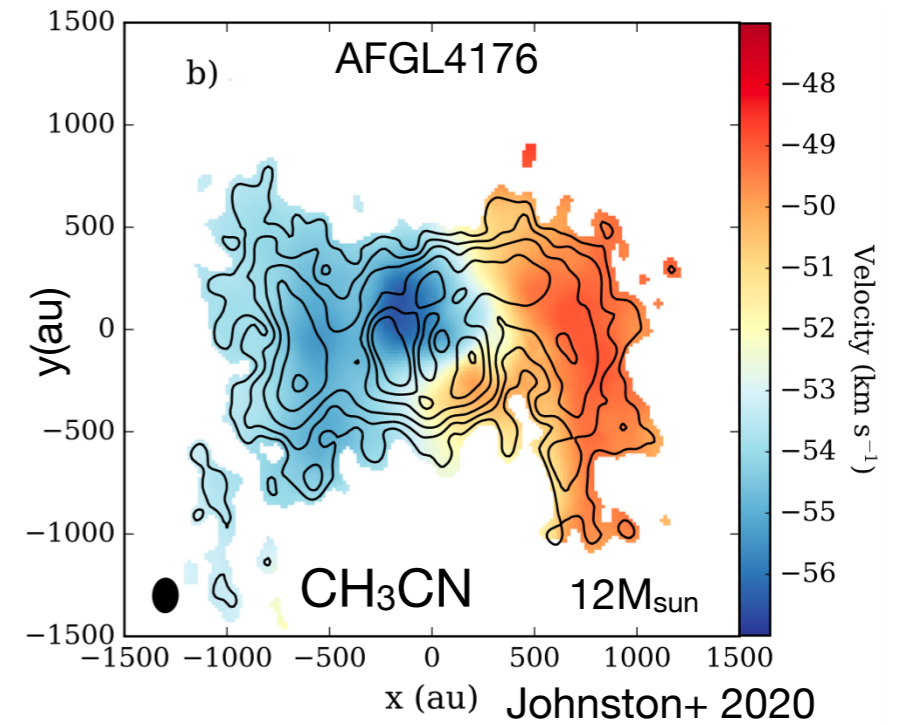
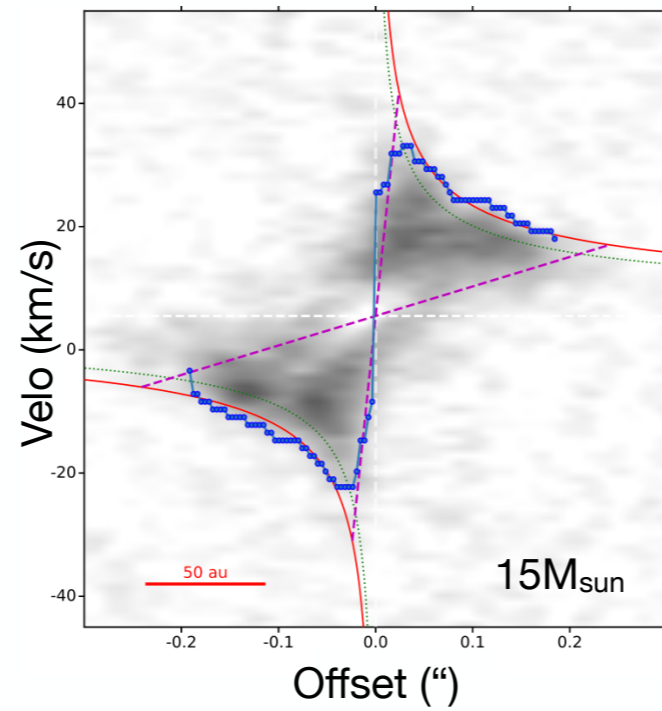
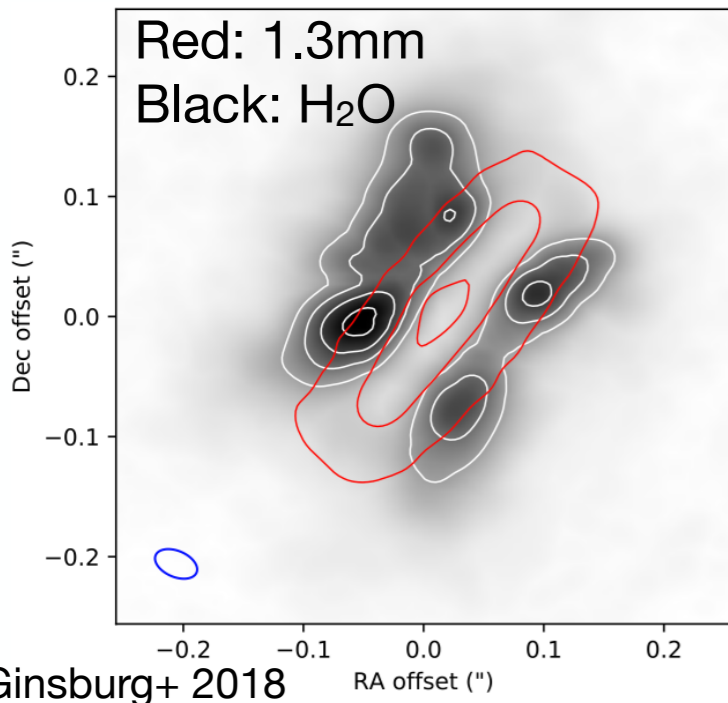
Some recent high-mass disk examples

Orion source I



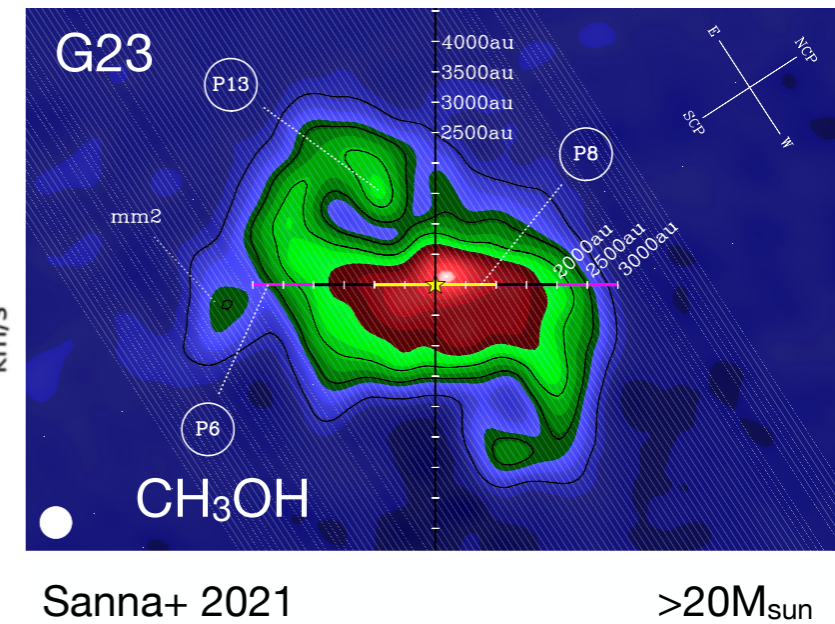
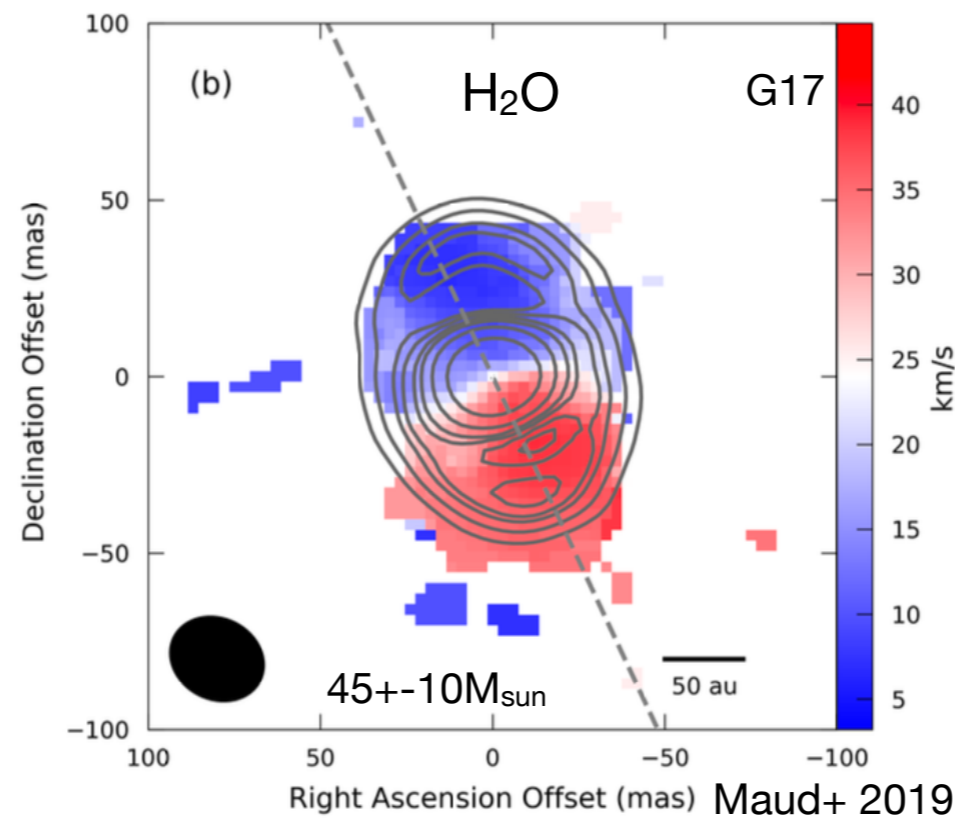
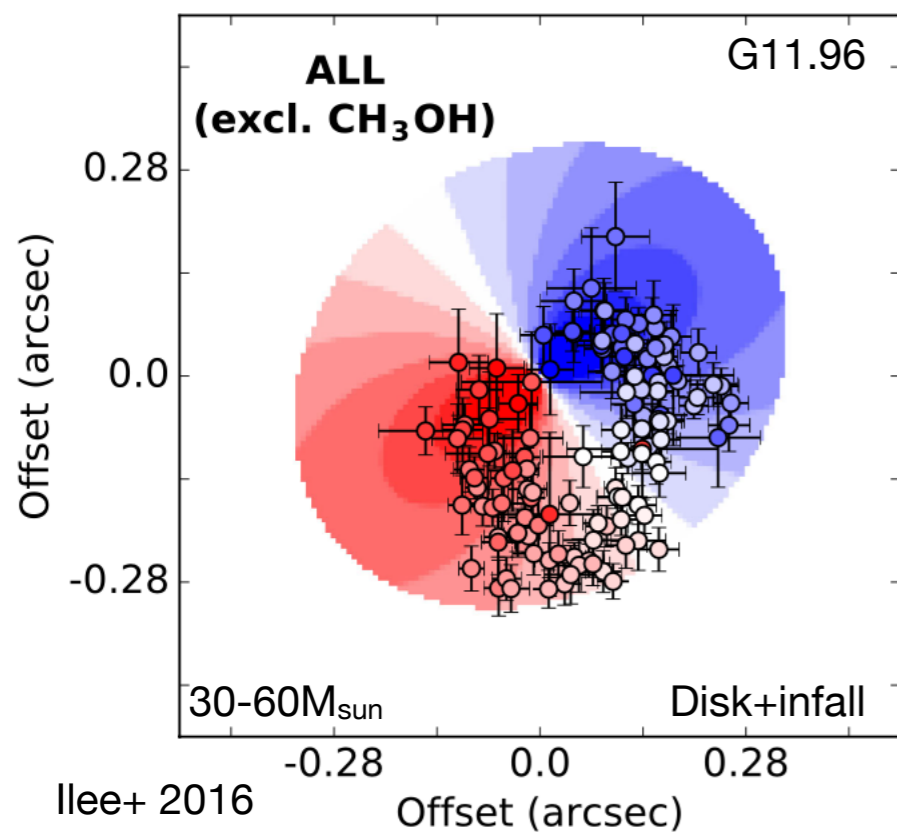
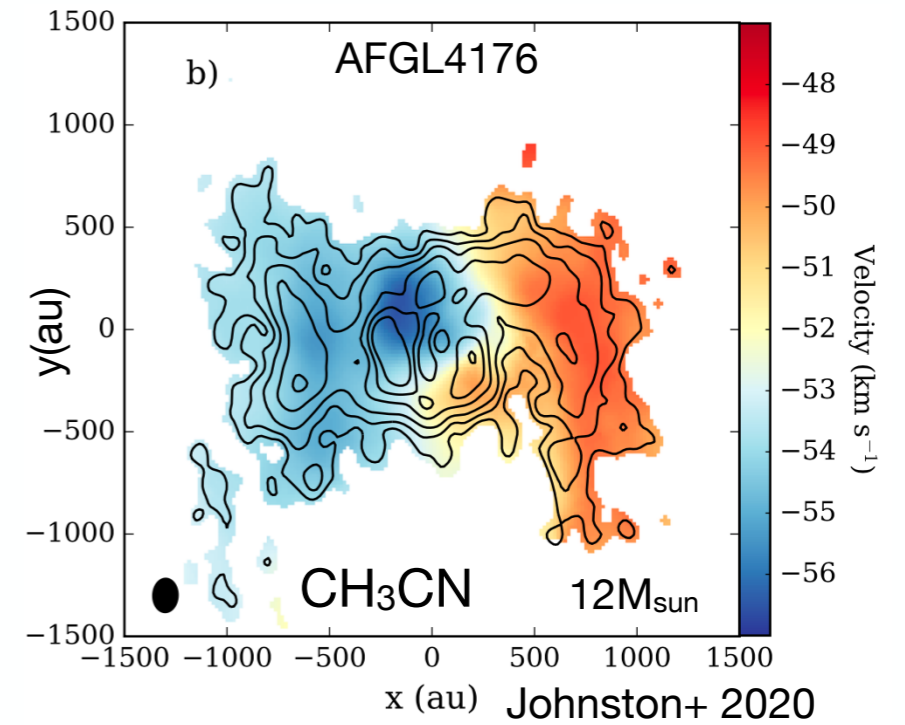
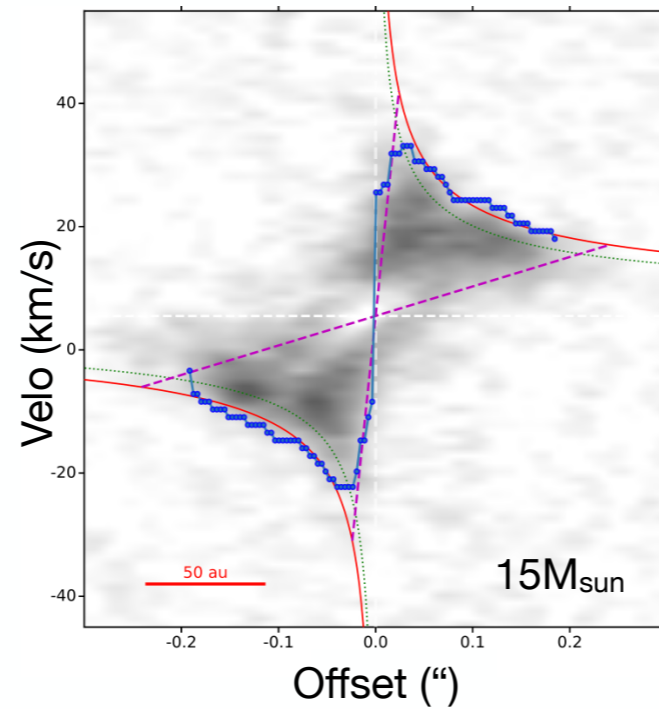
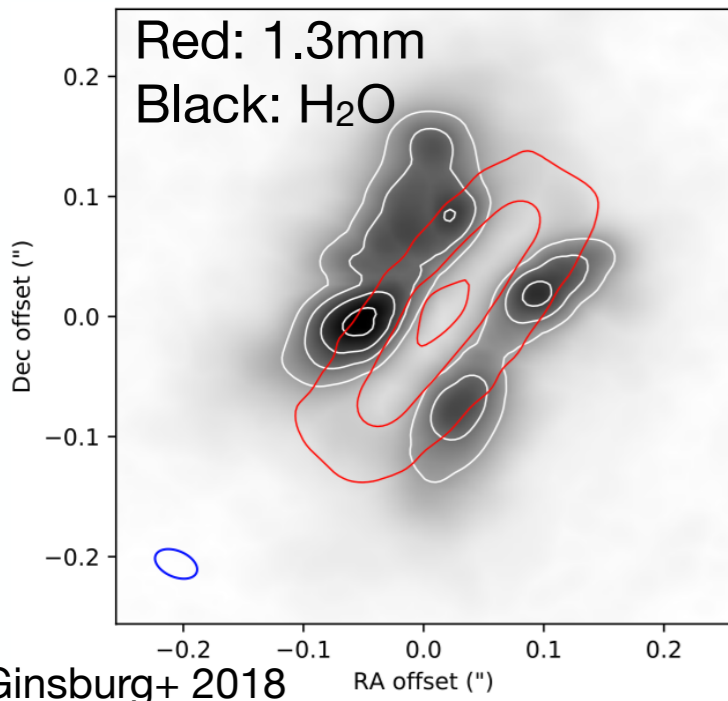
Some recent high-mass disk examples

Orion source I

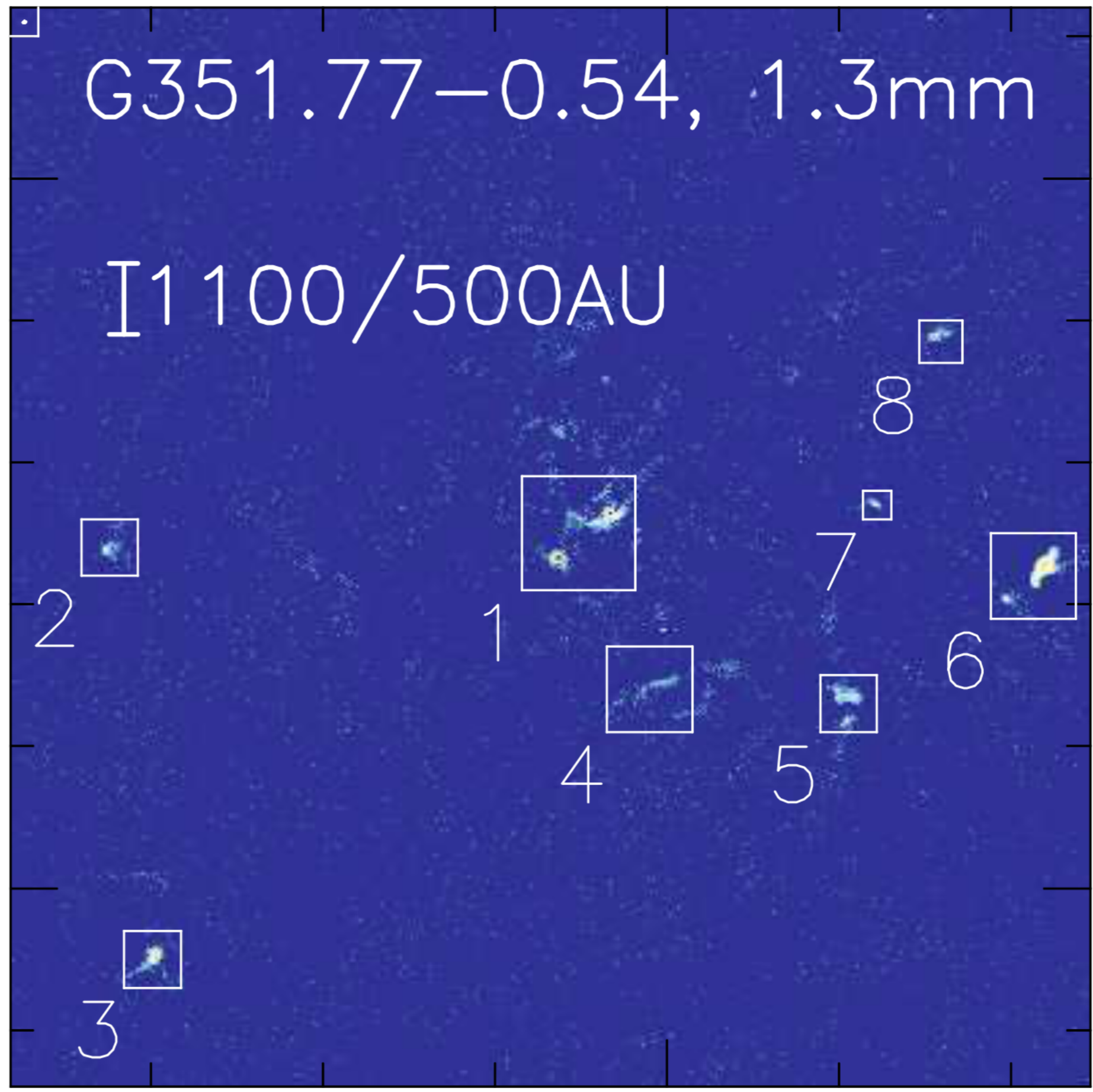


Some recent high-mass disk examples

Orion source I



—36°09'20" —36°09'15"



G351.77-0.54, 1.3mm

I1100/500AU

2

1

8

7

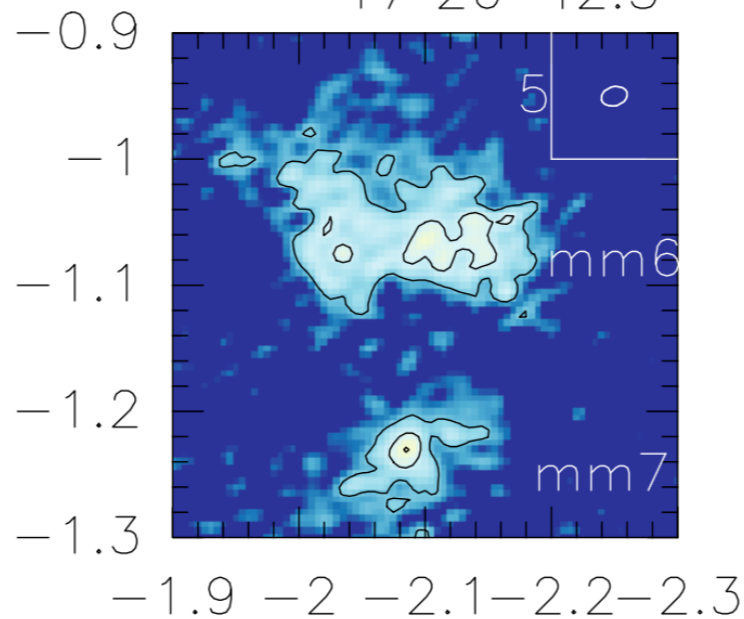
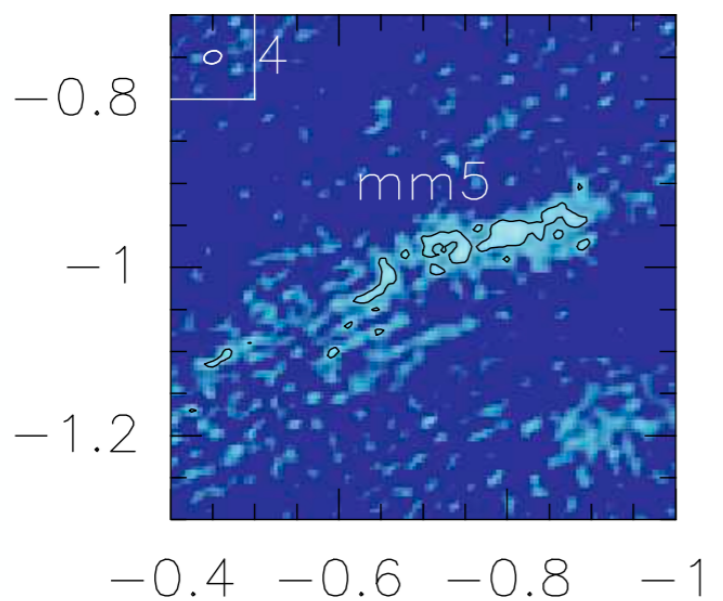
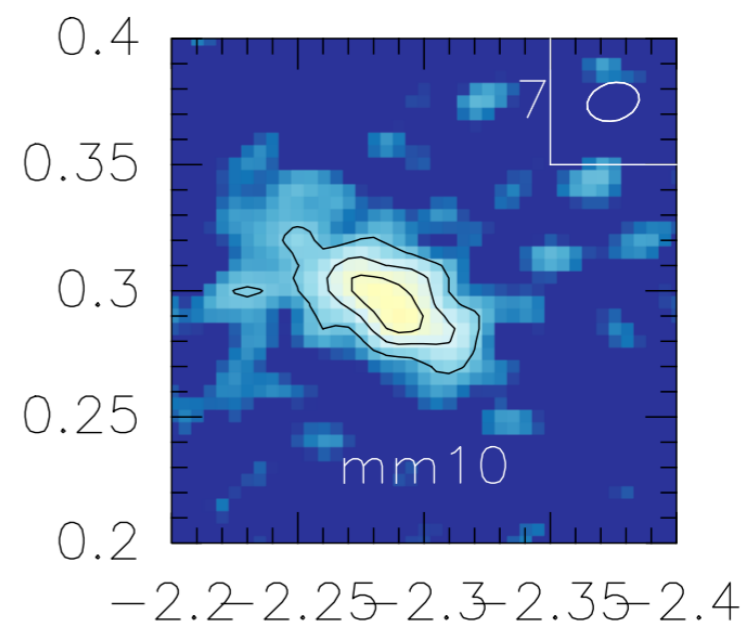
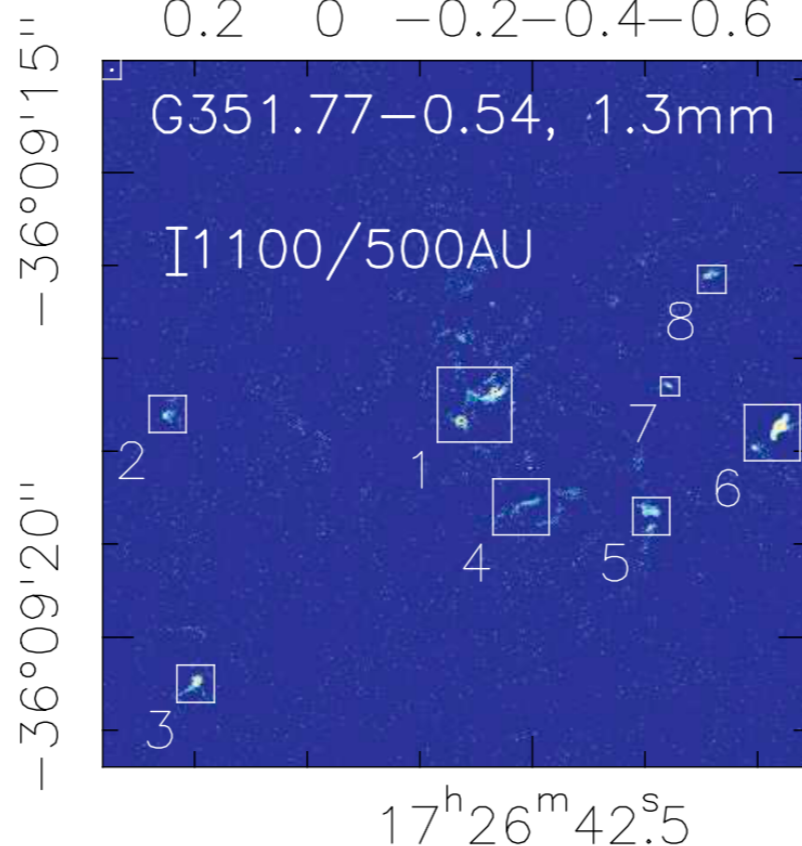
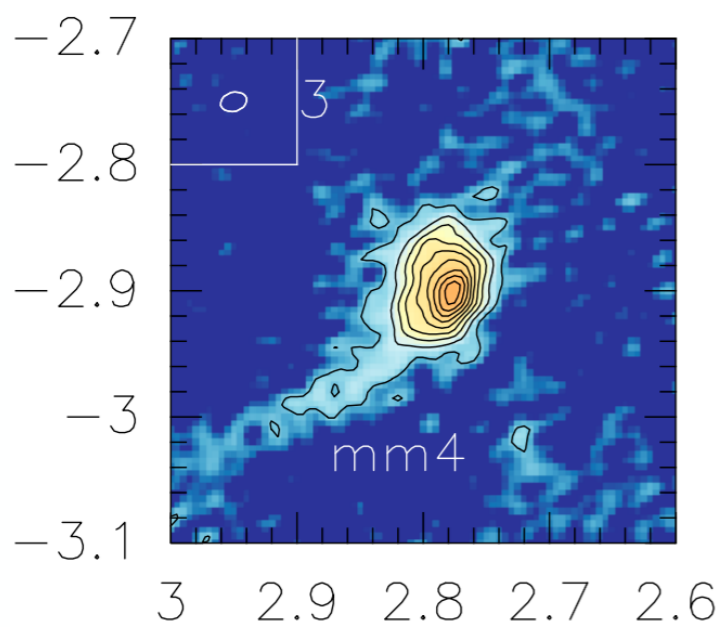
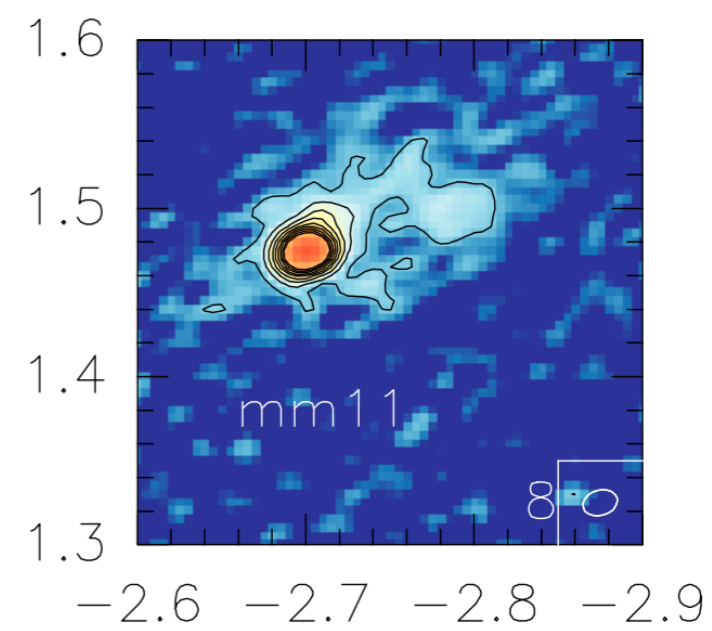
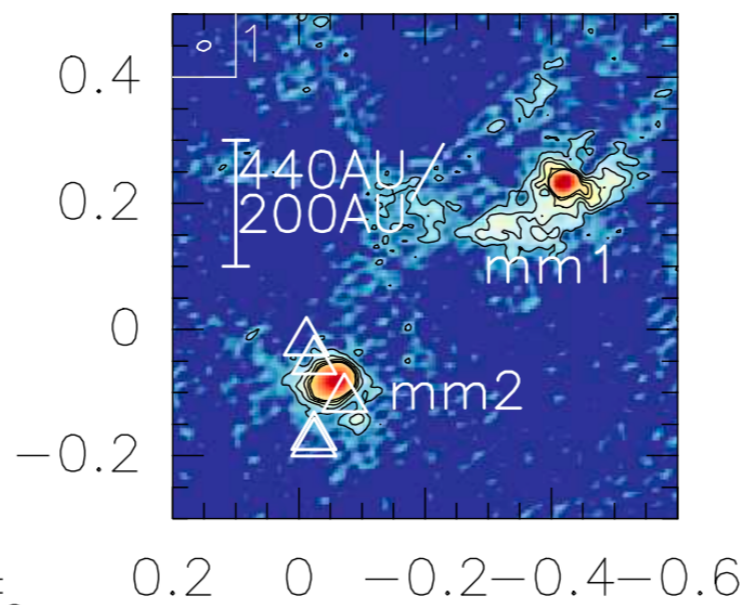
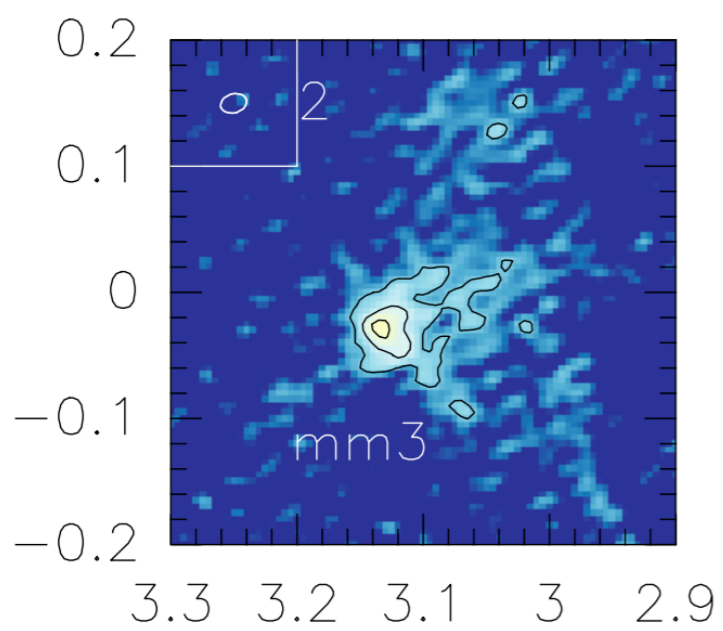
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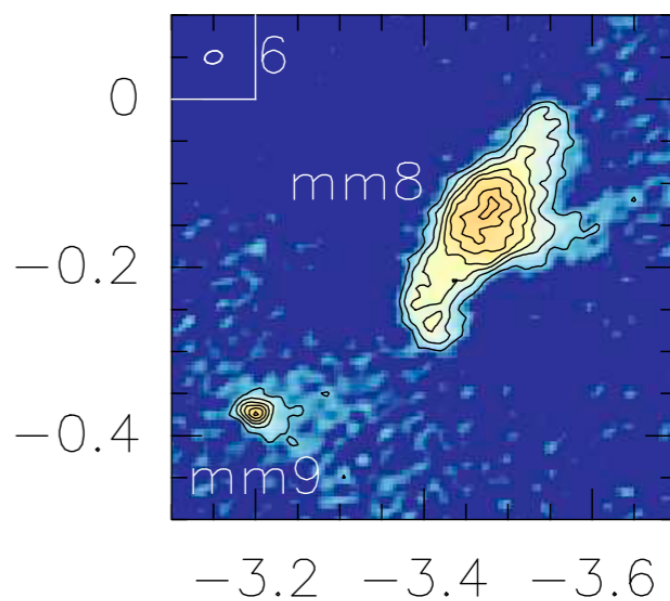
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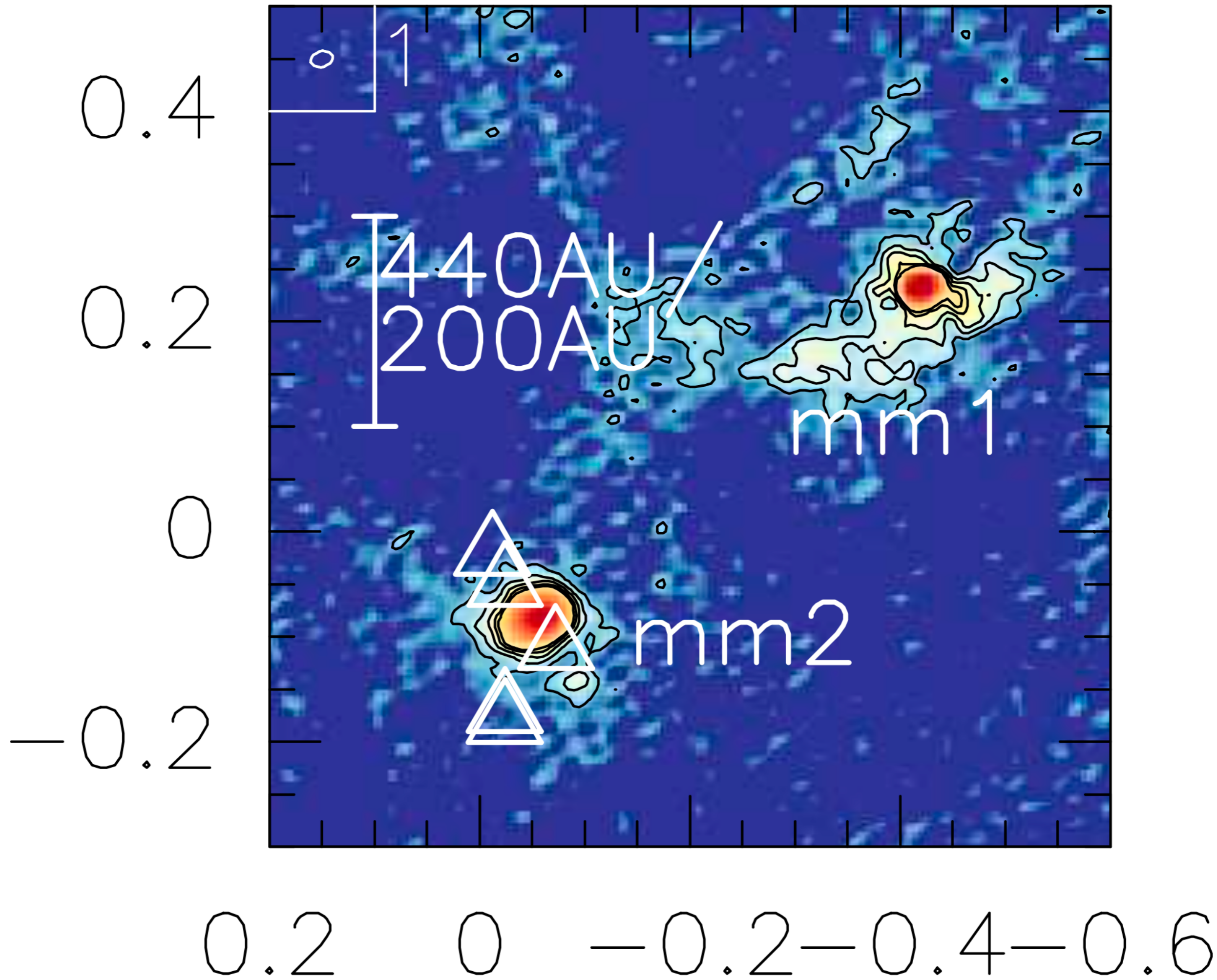
3

17^h 26^m 42.5^s

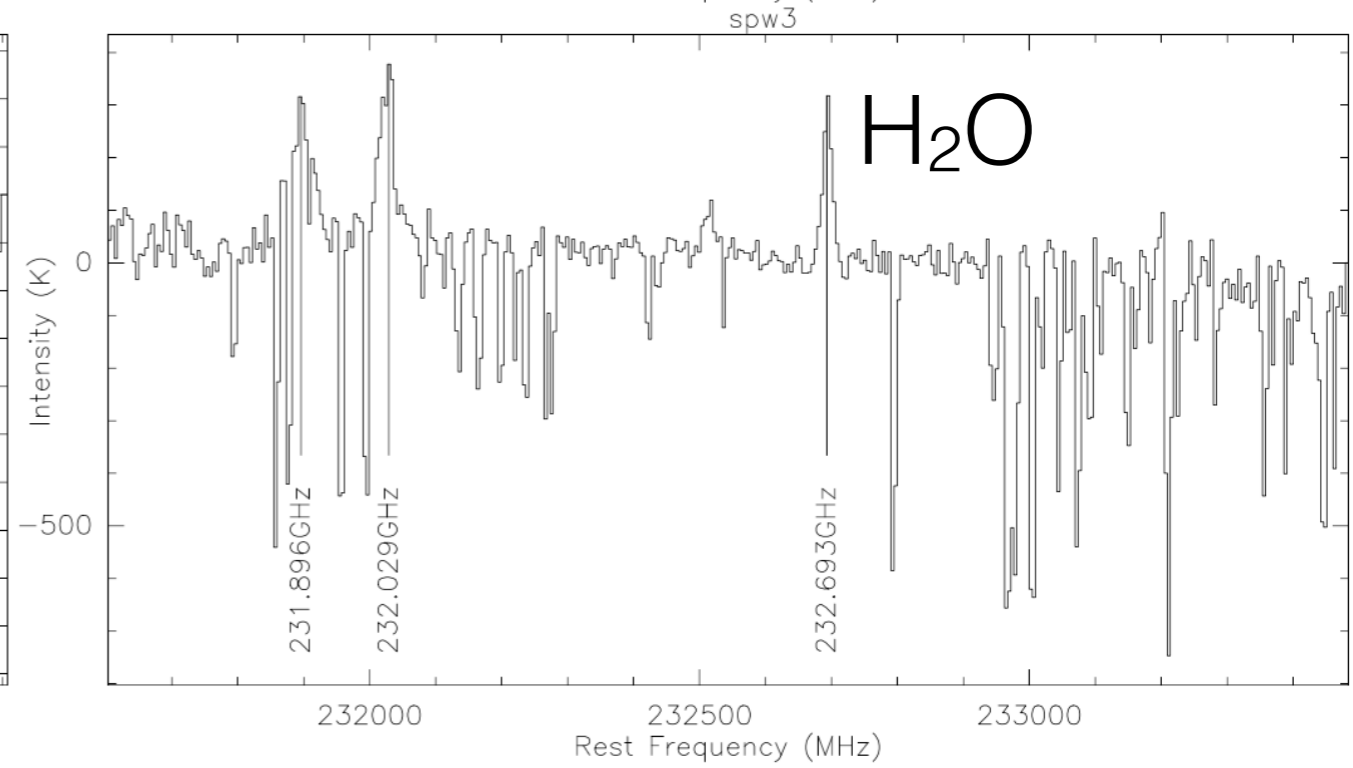
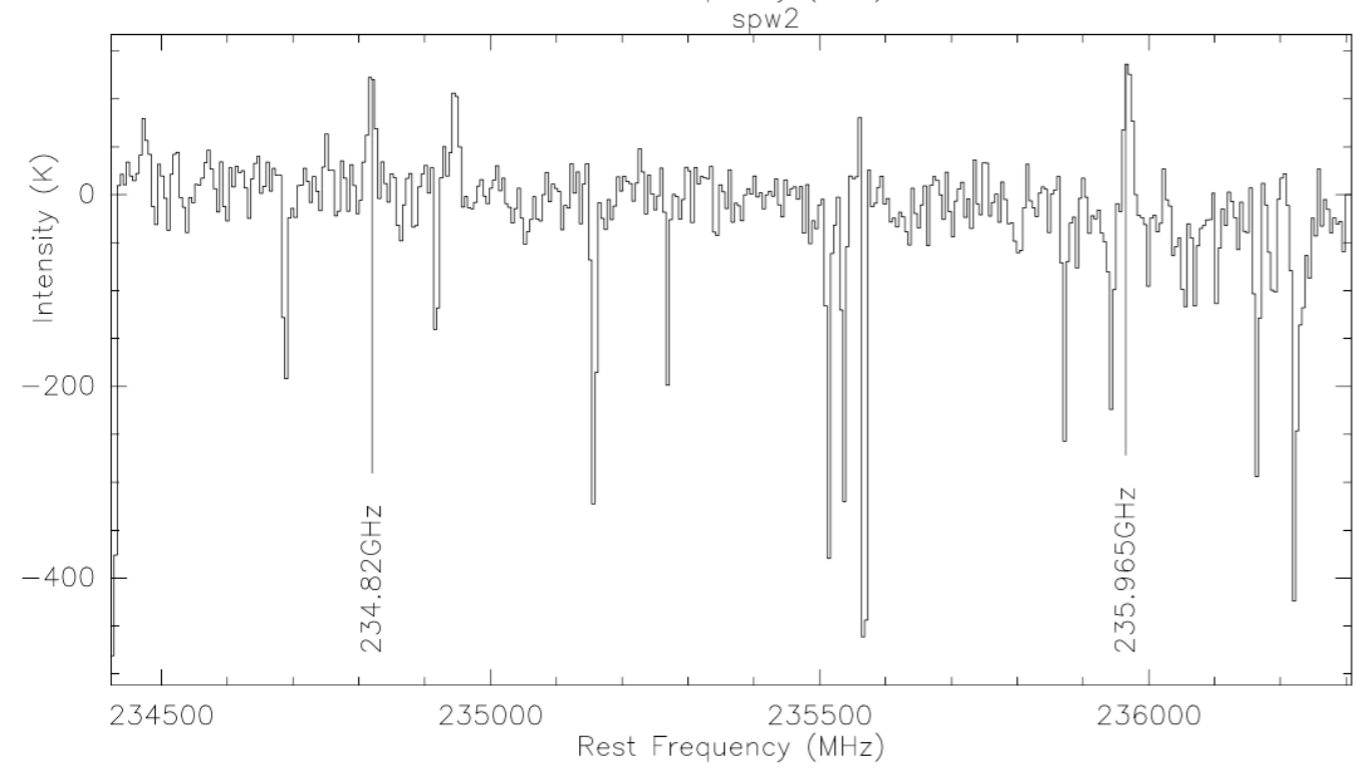
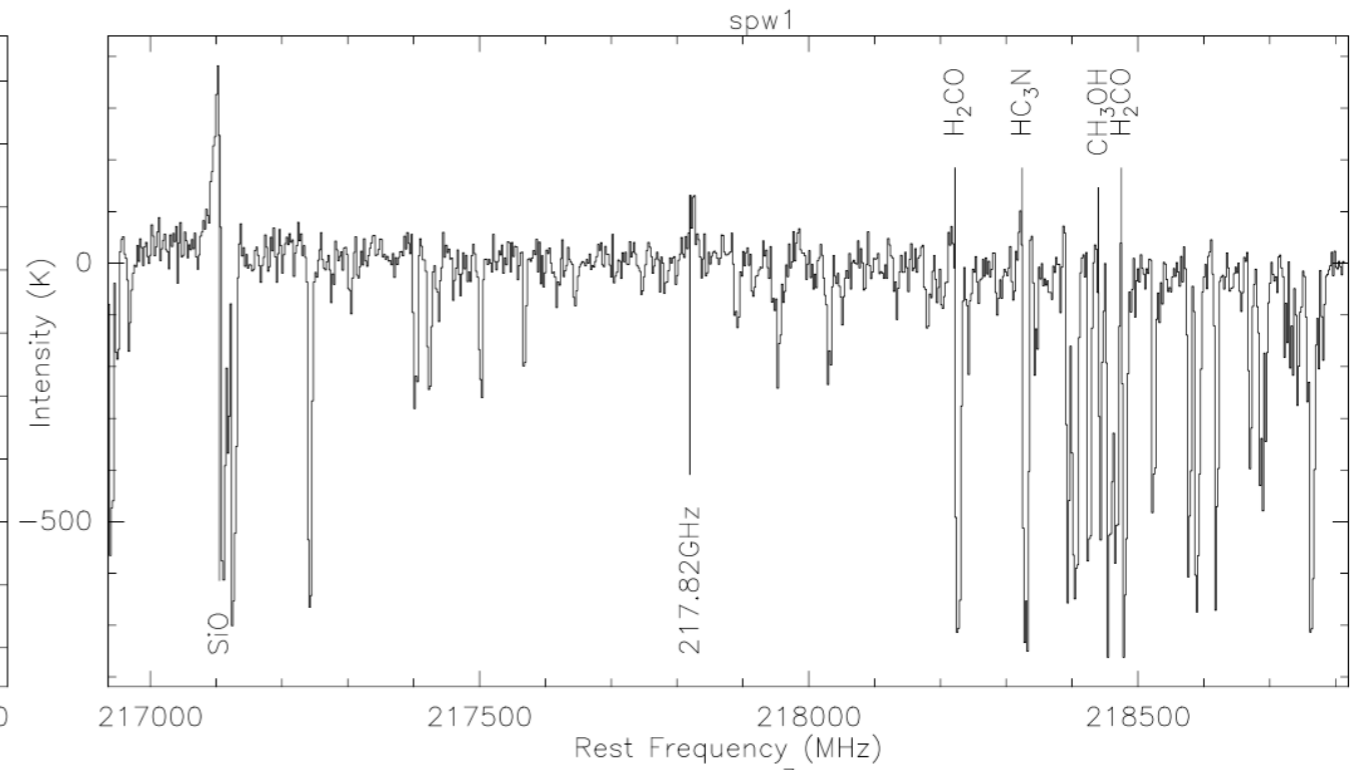
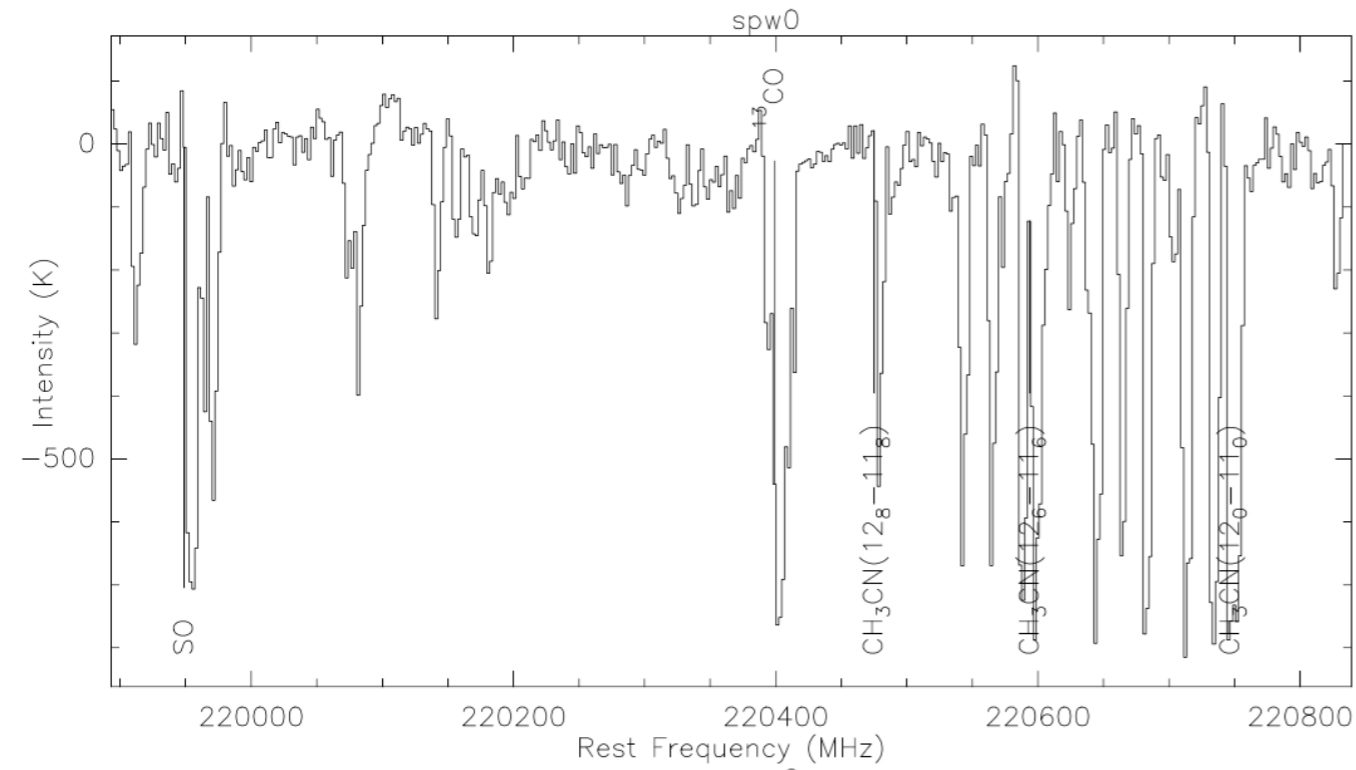


Beuther et al. 2019

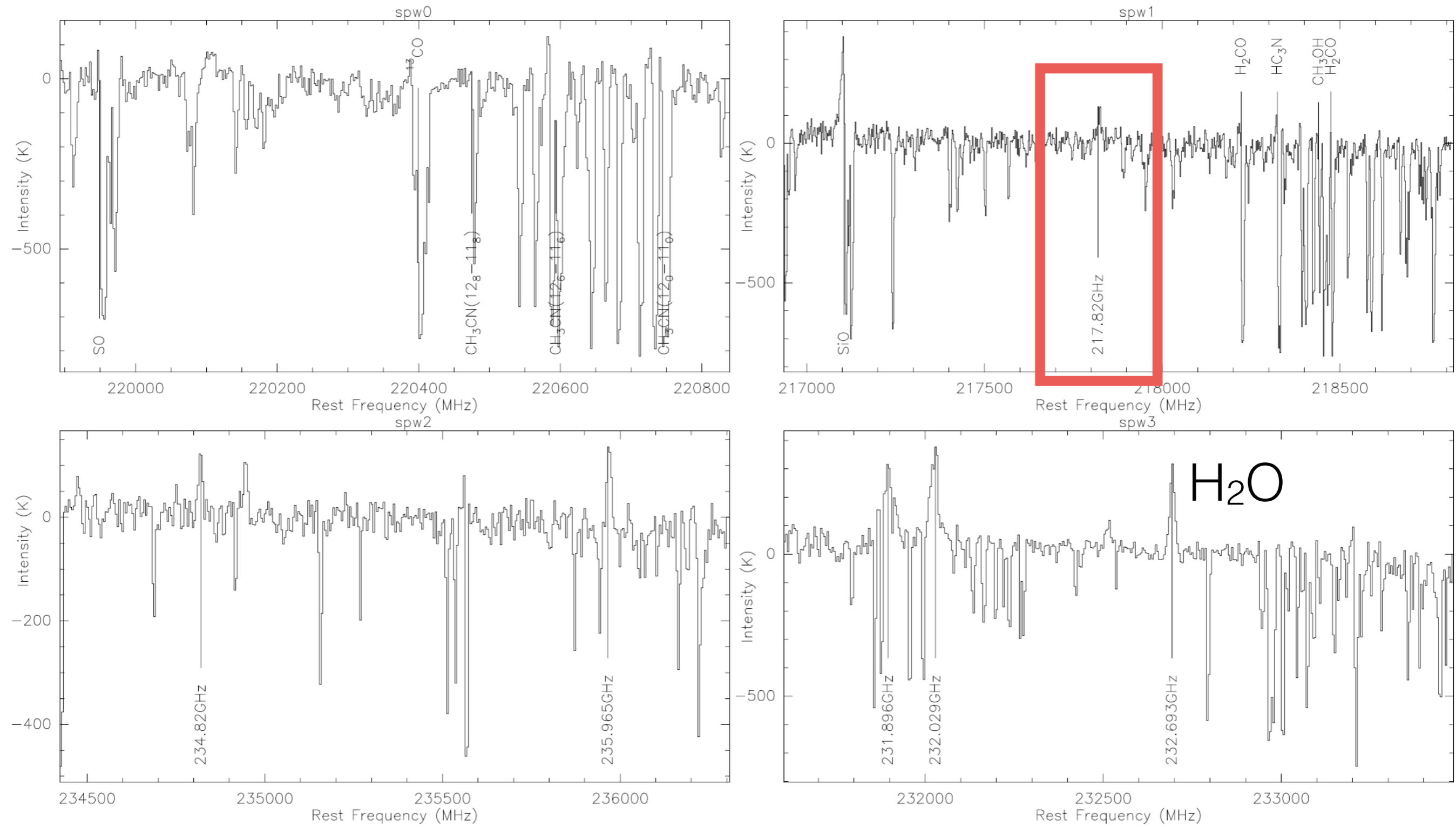




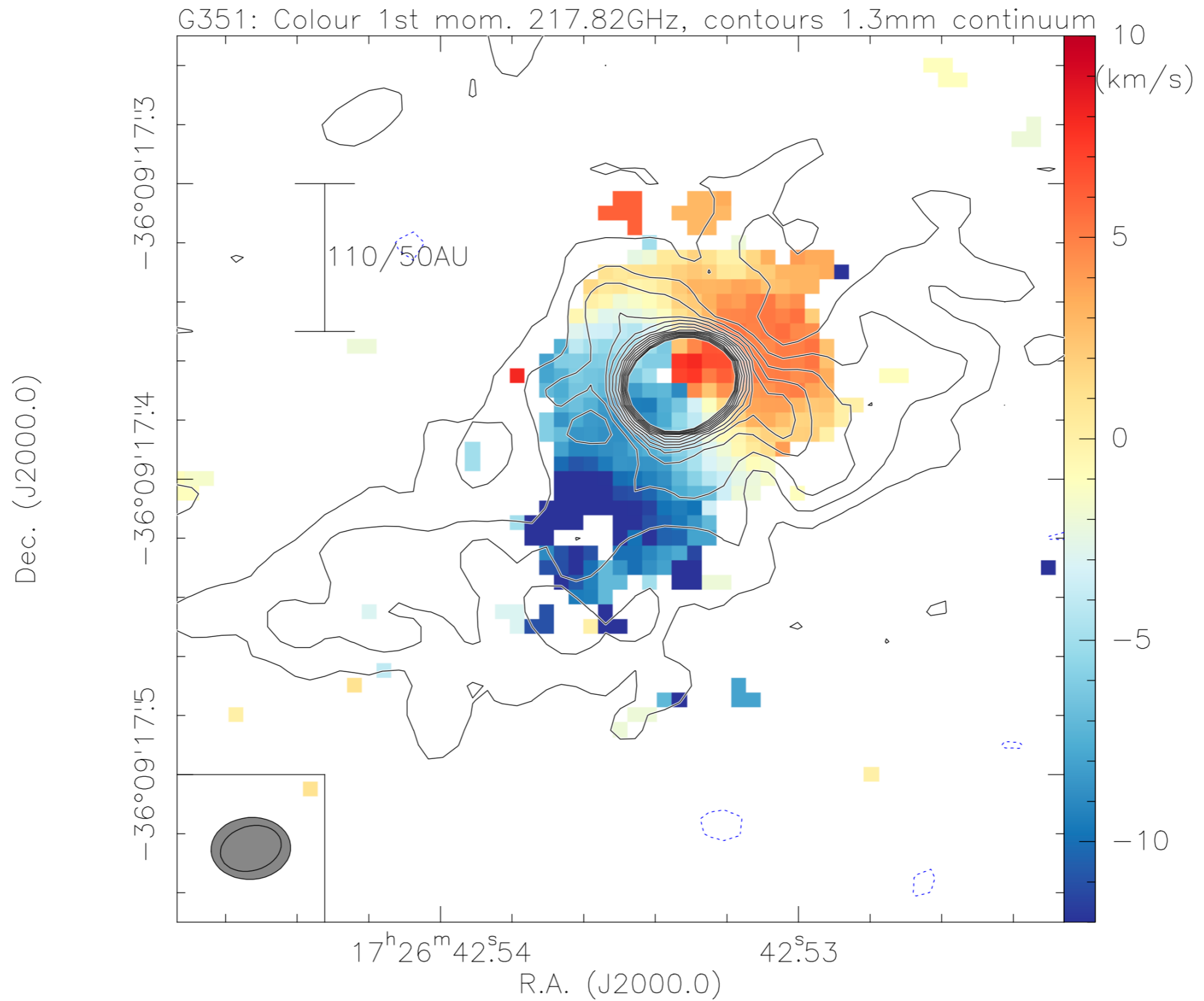
Spectral lines



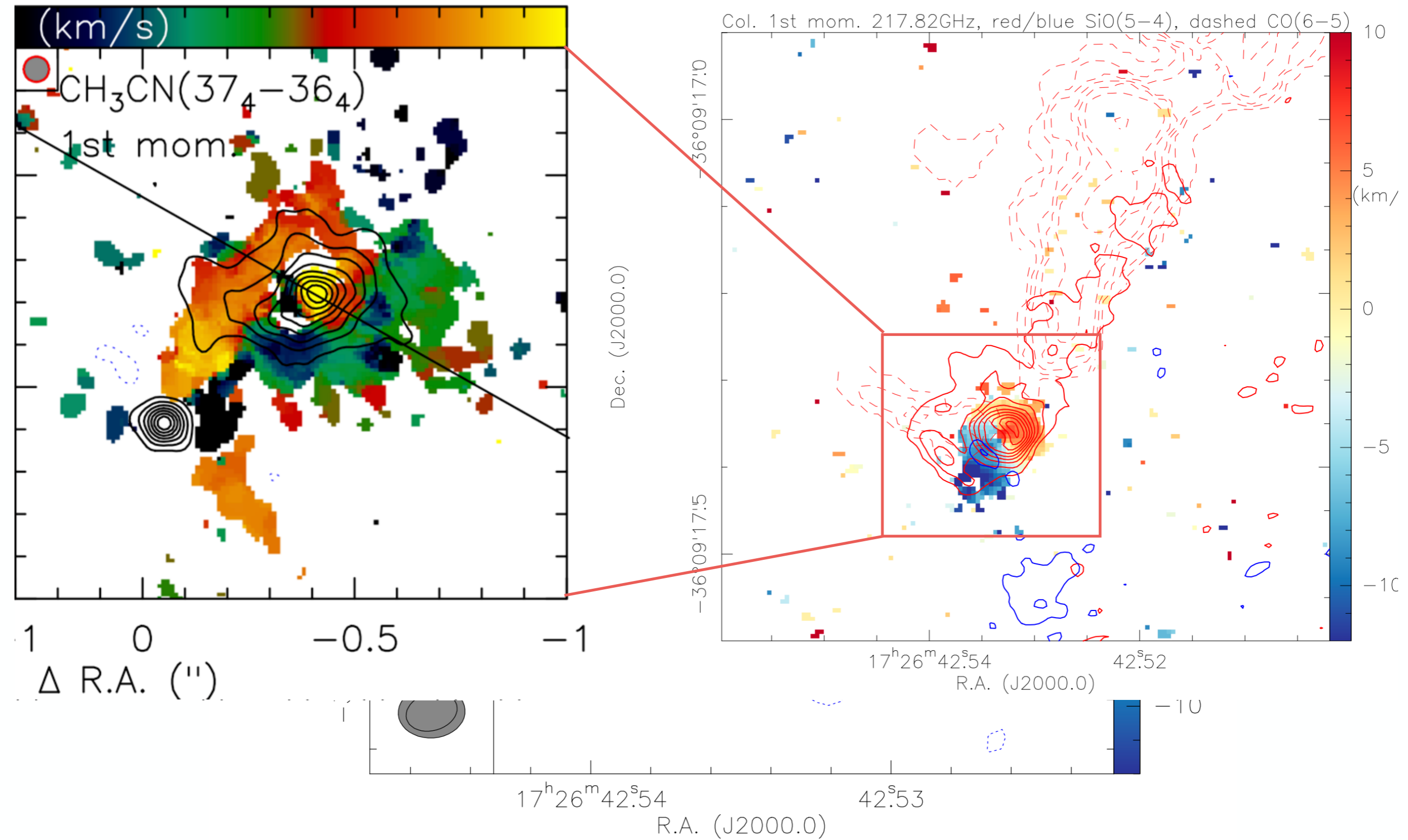
Spectral lines



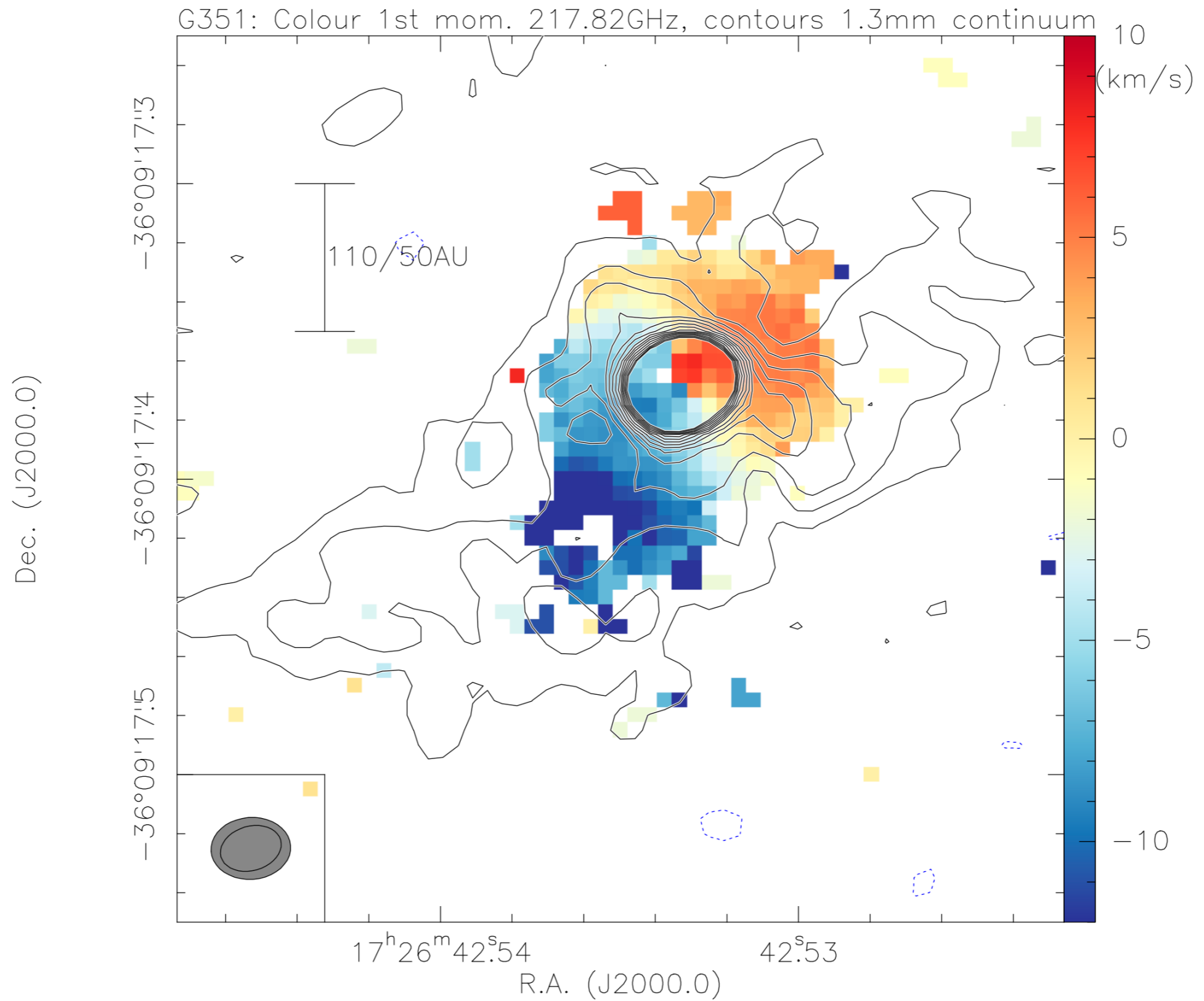
Gas velocities



Gas velocities

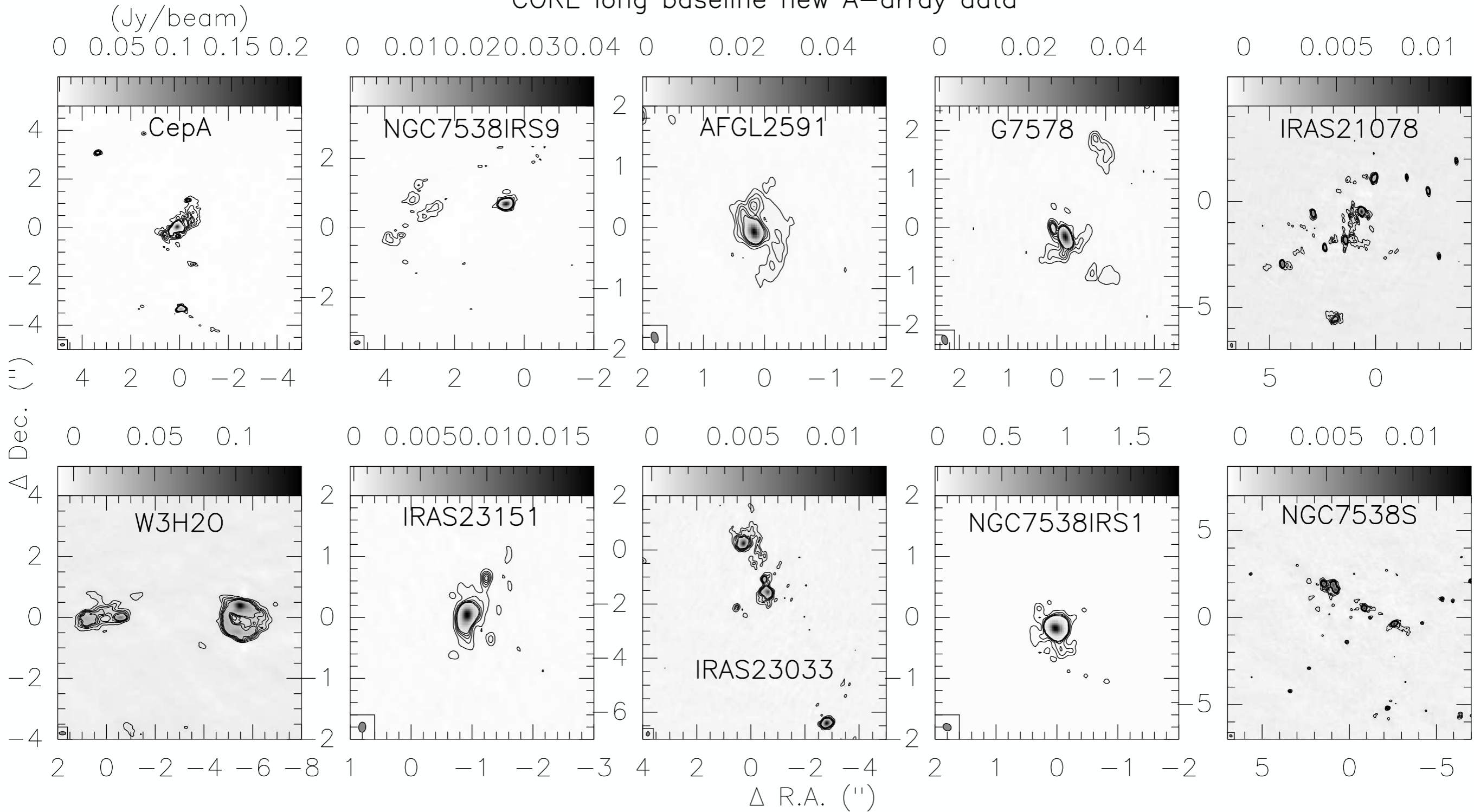


Gas velocities



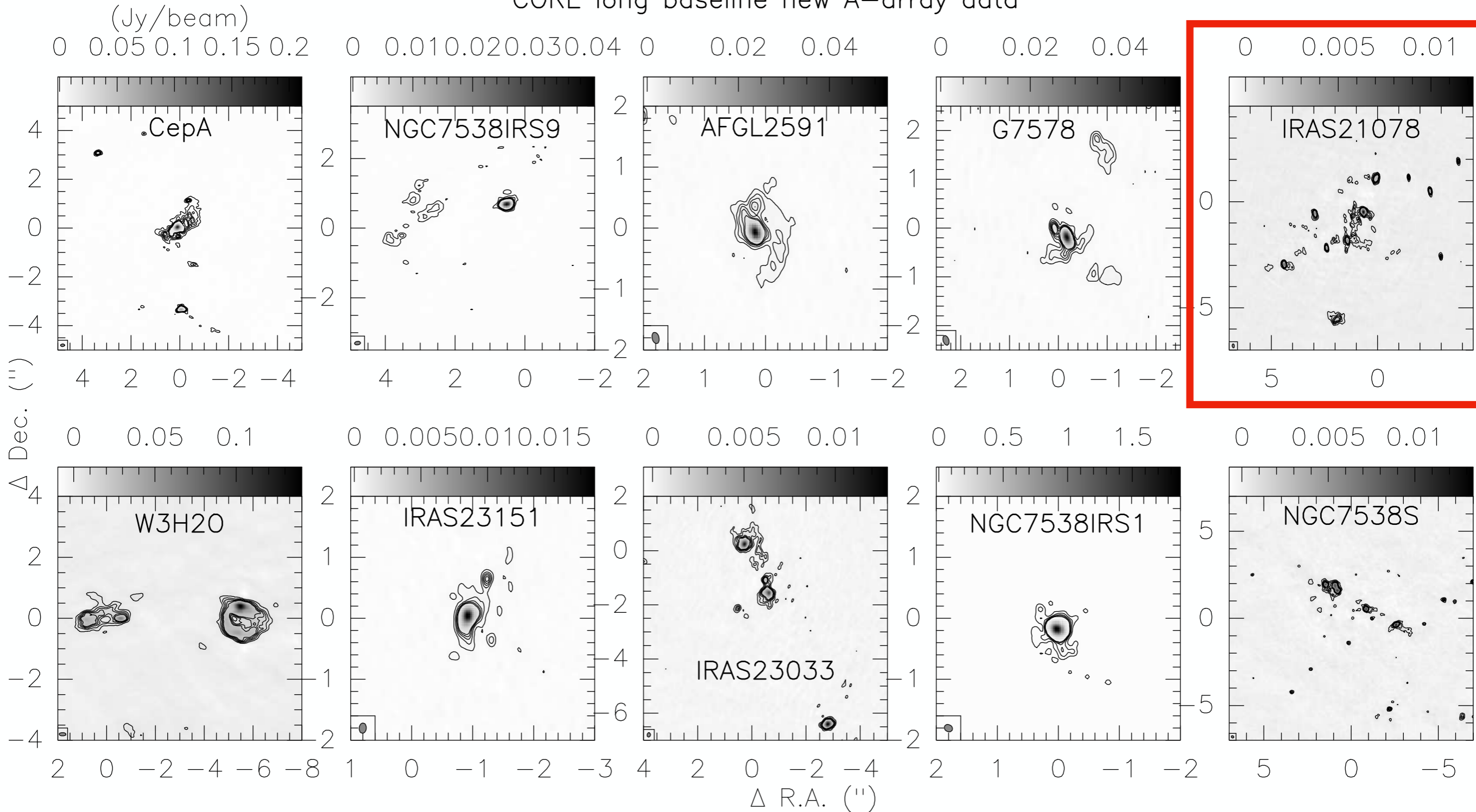
CORE - NOEMA long baseline data

CORE long baseline new A-array data



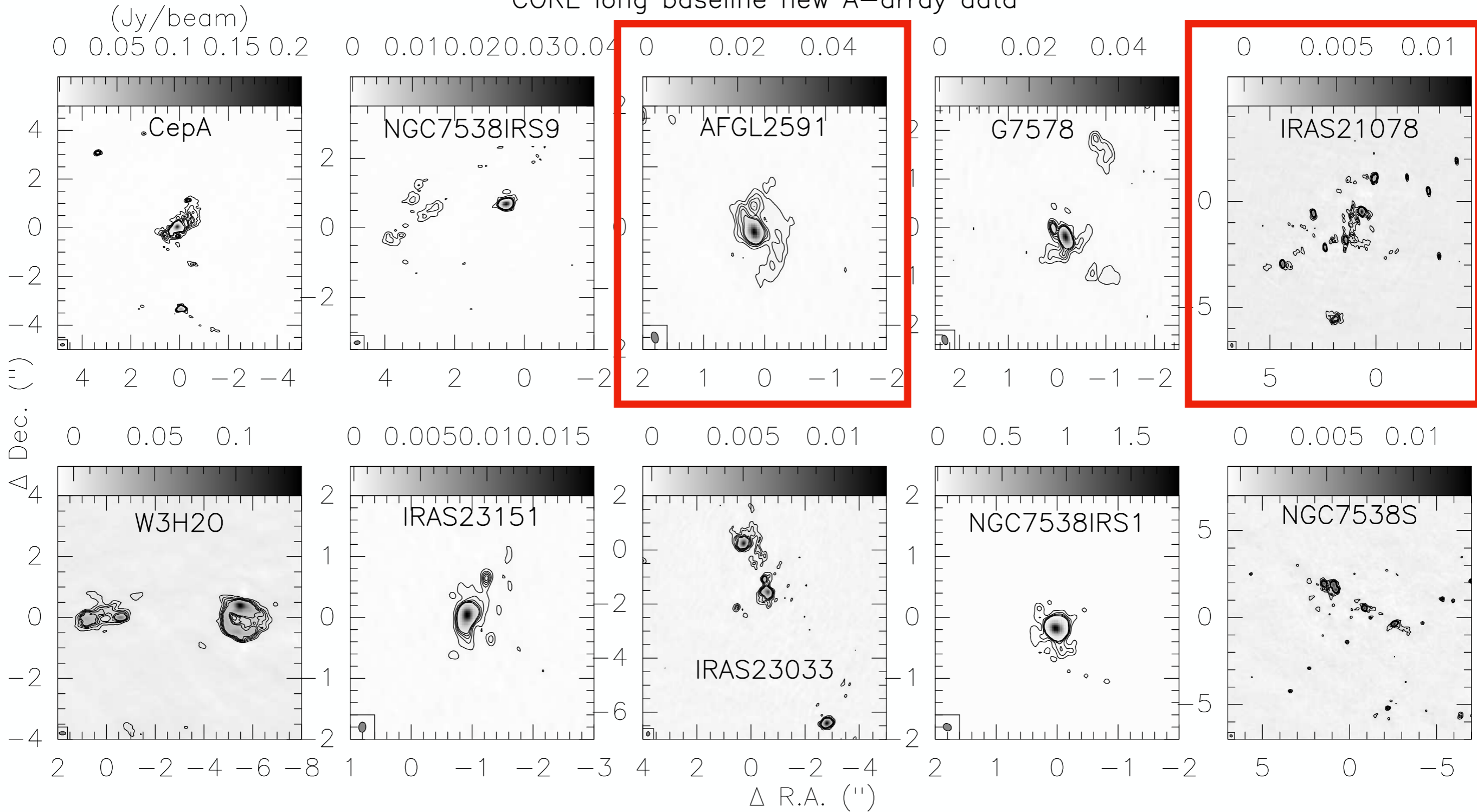
CORE - NOEMA long baseline data

CORE long baseline new A-array data

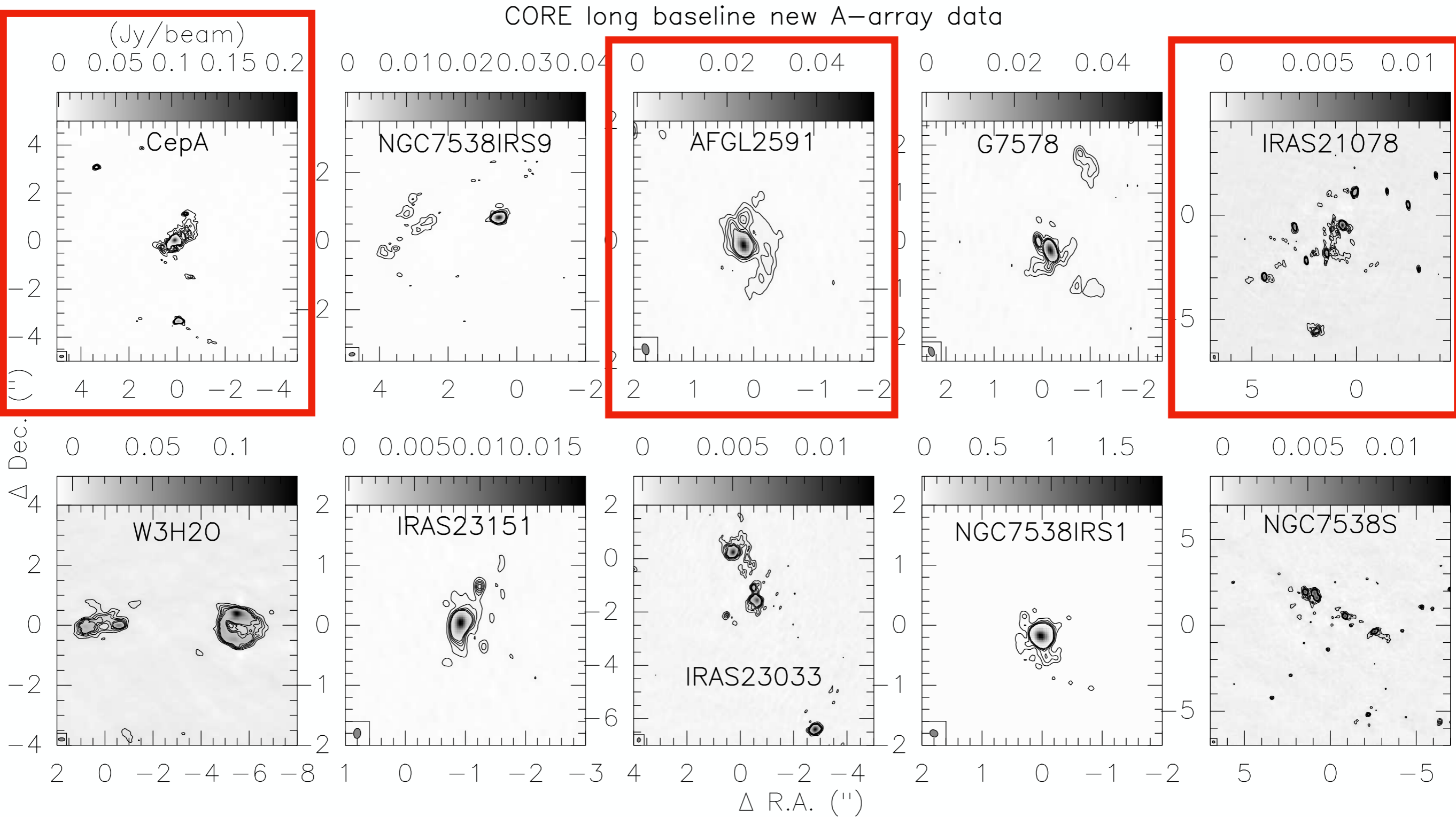


CORE - NOEMA long baseline data

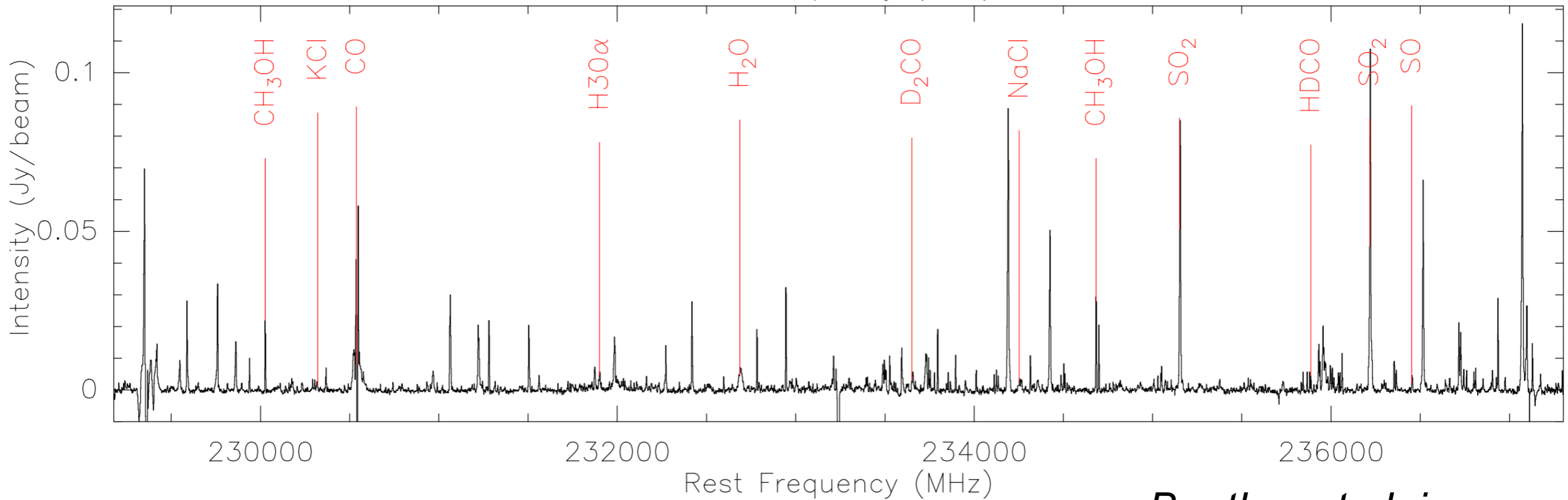
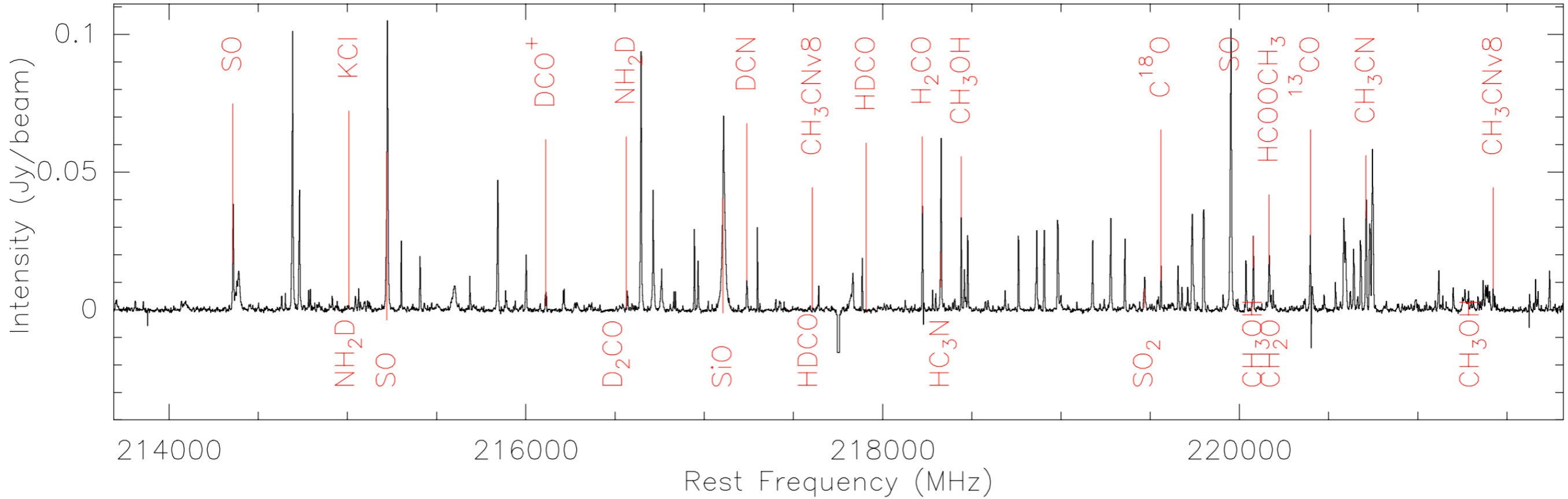
CORE long baseline new A-array data



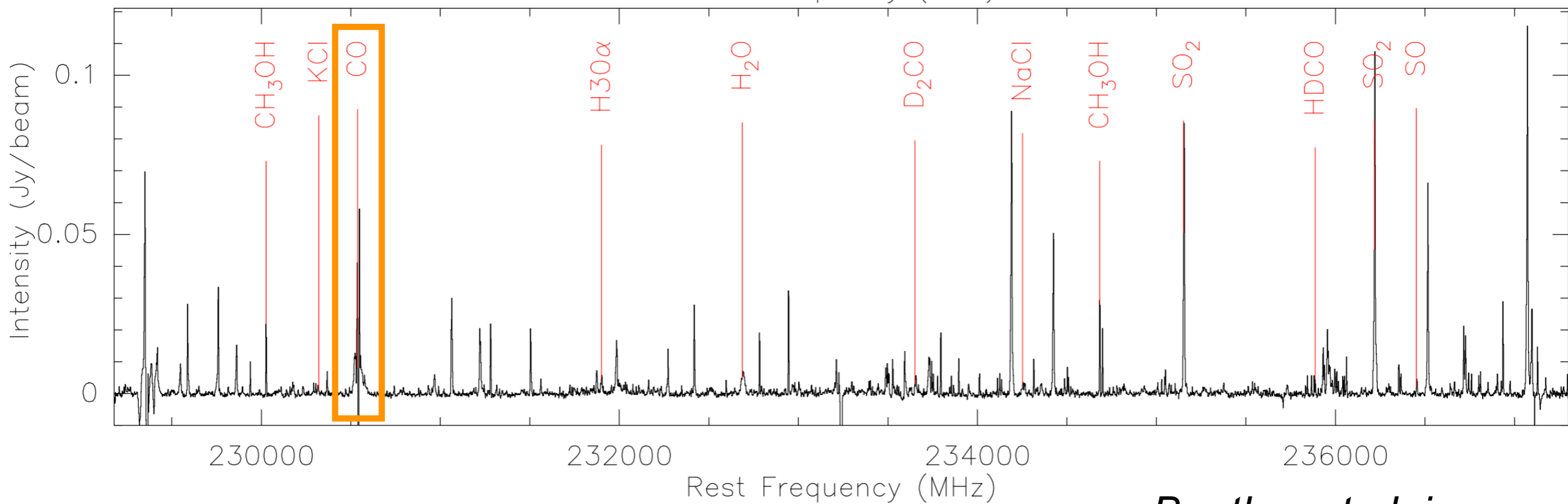
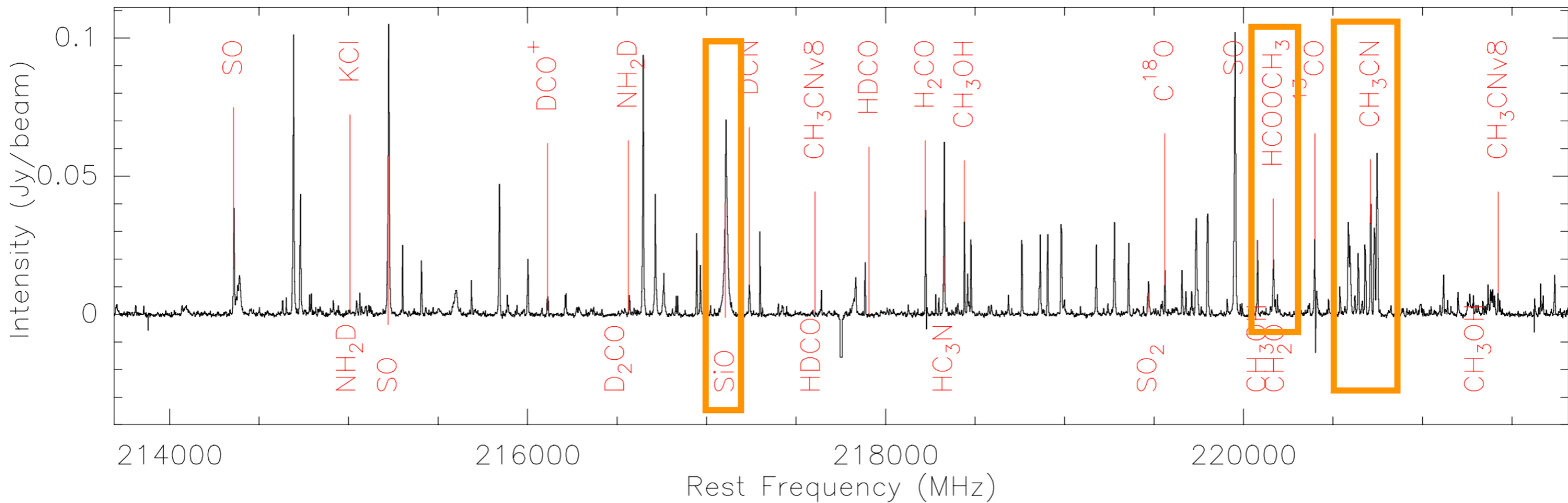
CORE - NOEMA long baseline data



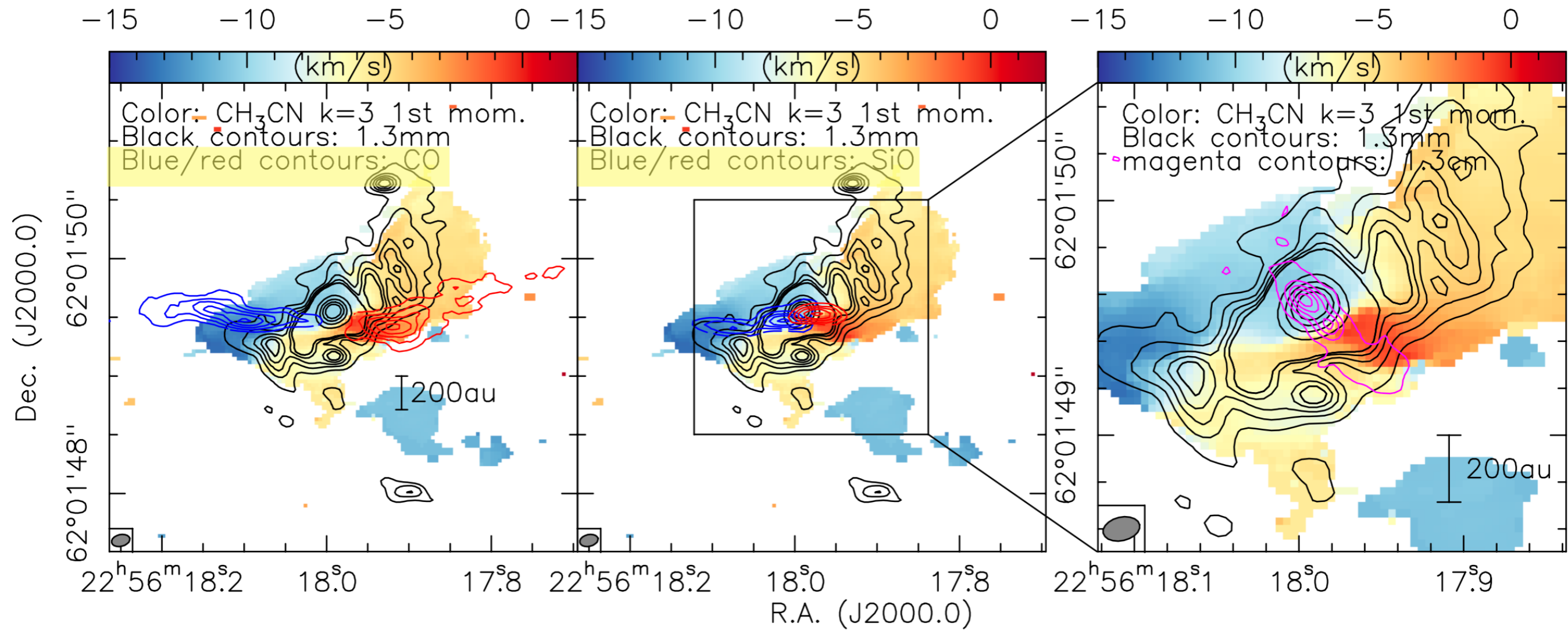
CepA spectral setup



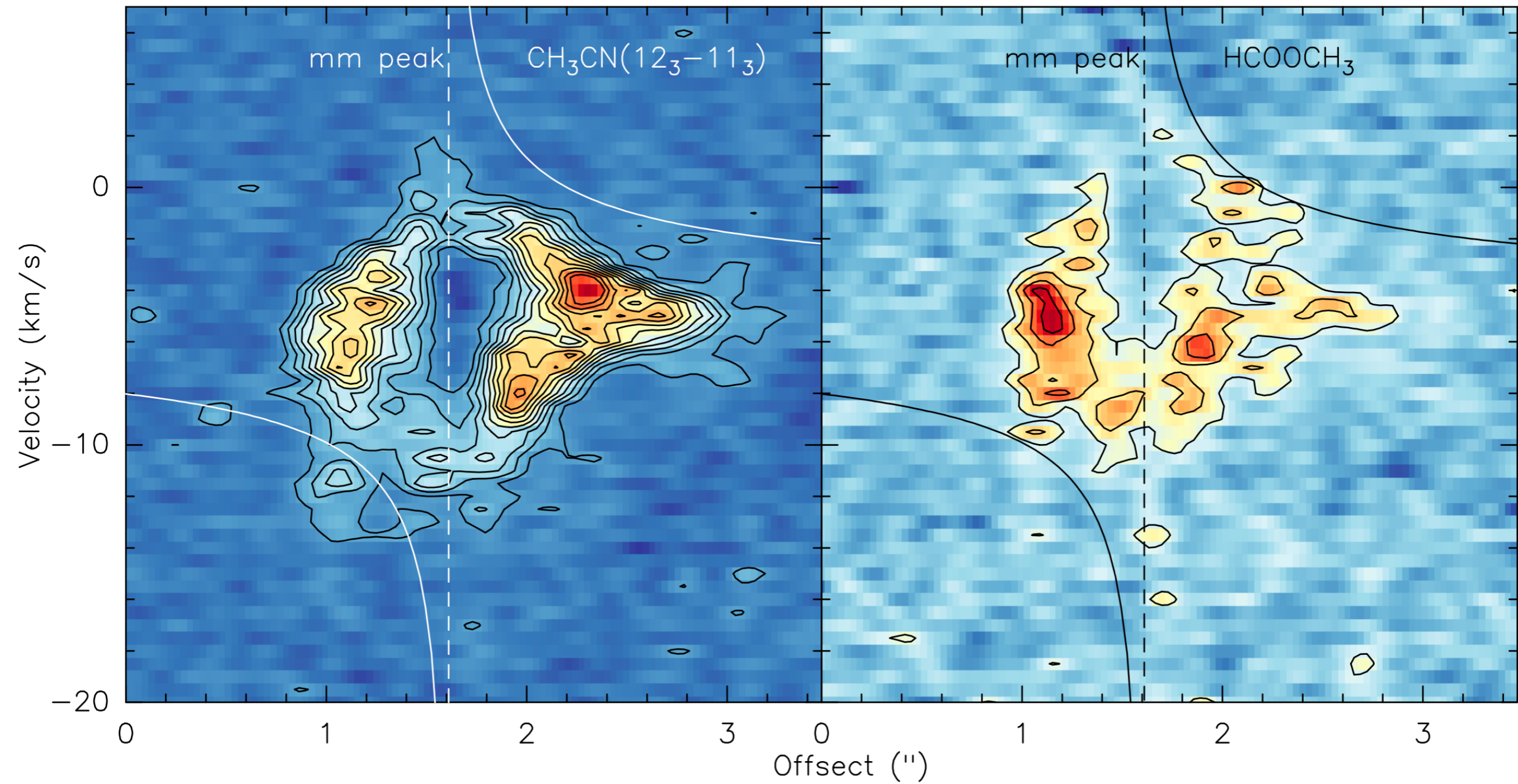
CepA spectral setup



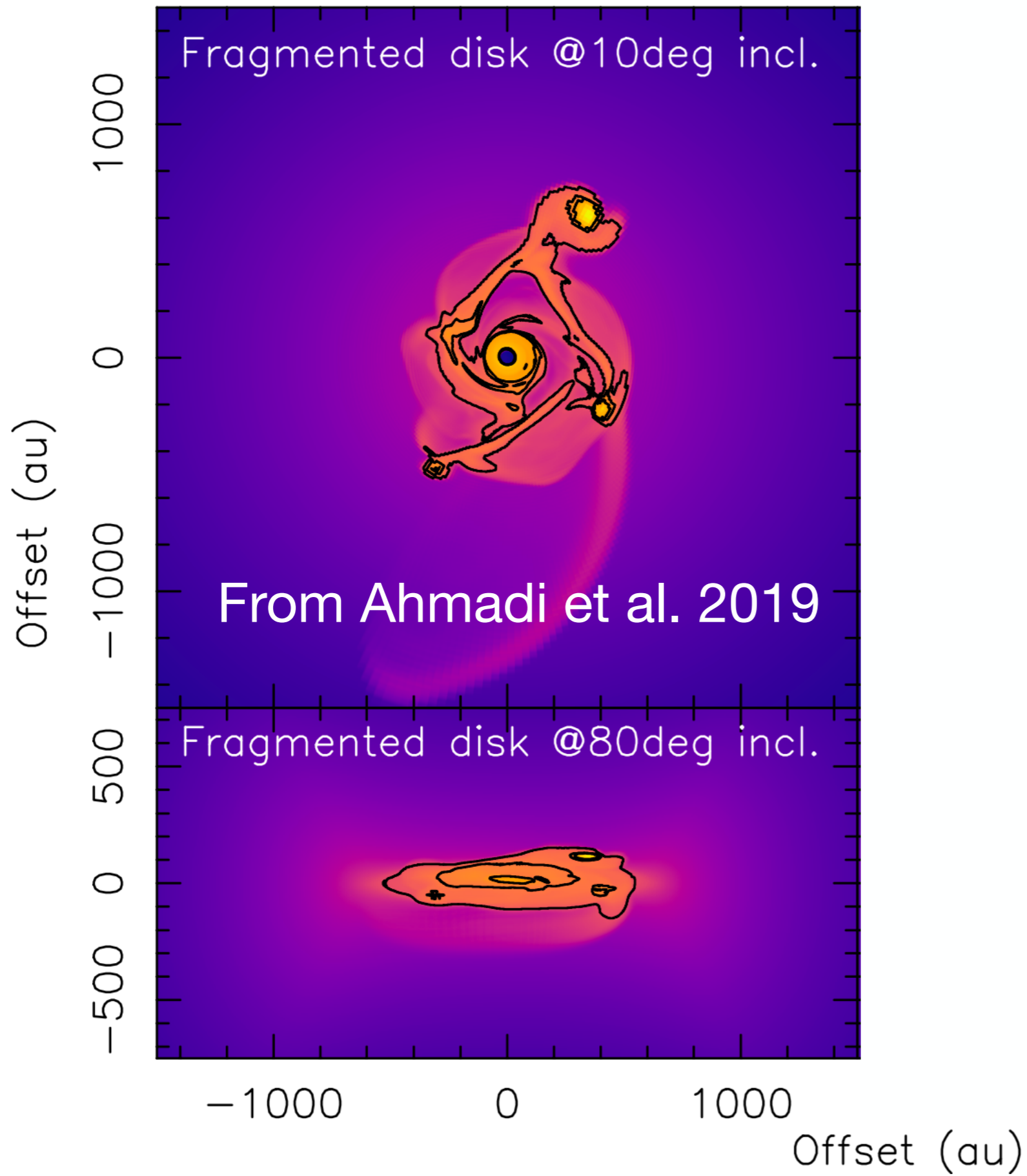
CepA - outflows and dense gas



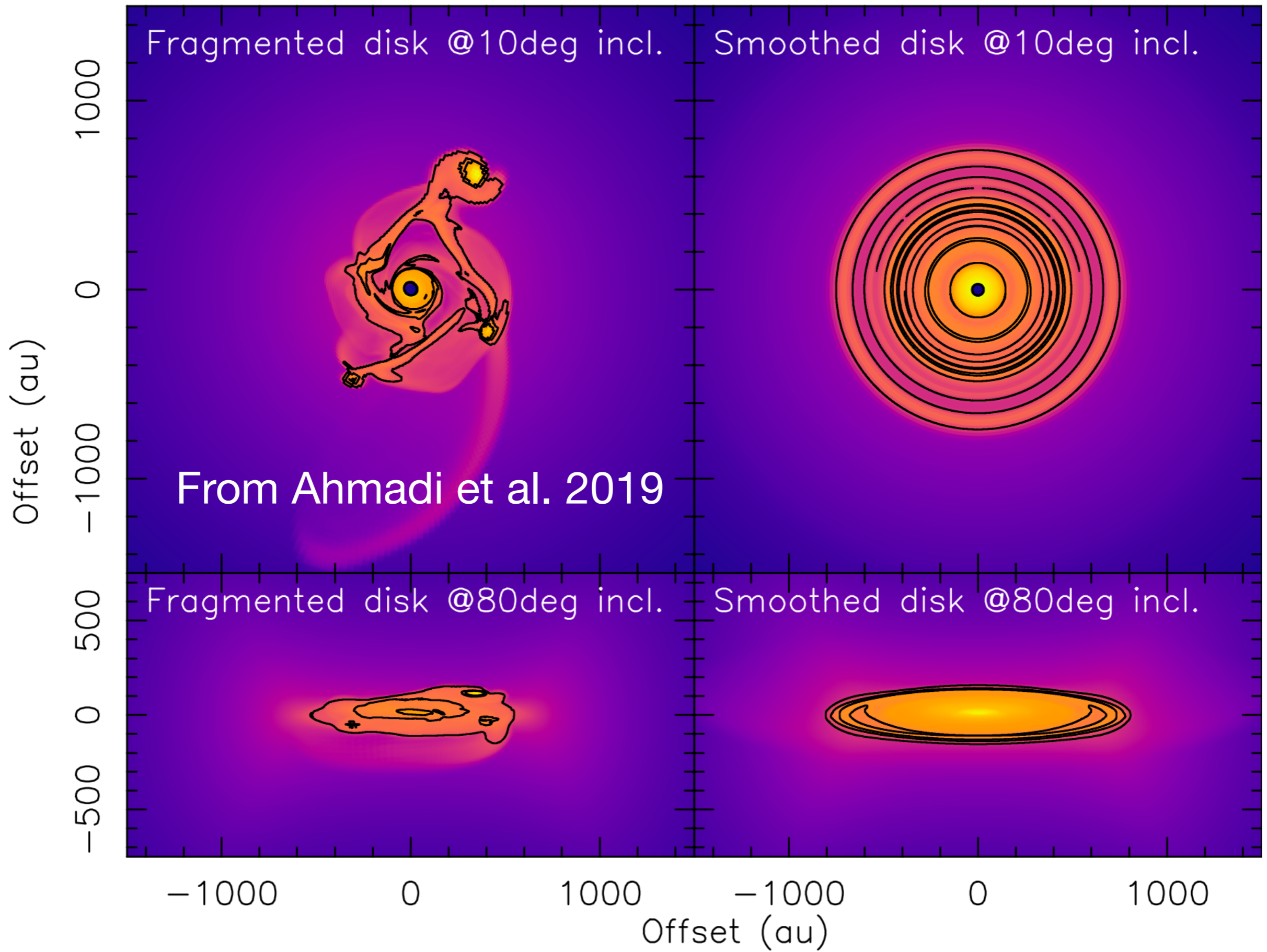
CepA - kinematics of disk



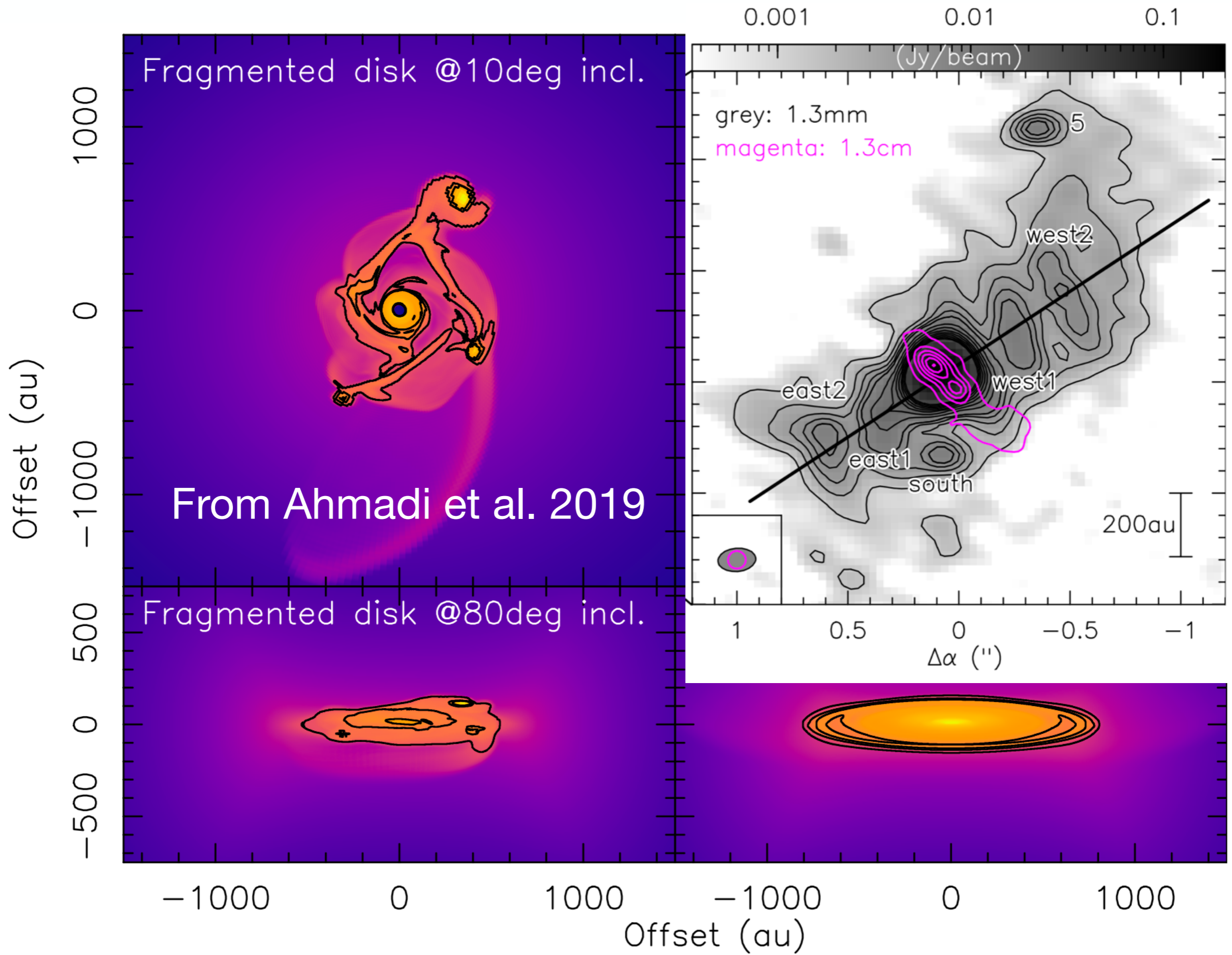
Disk models



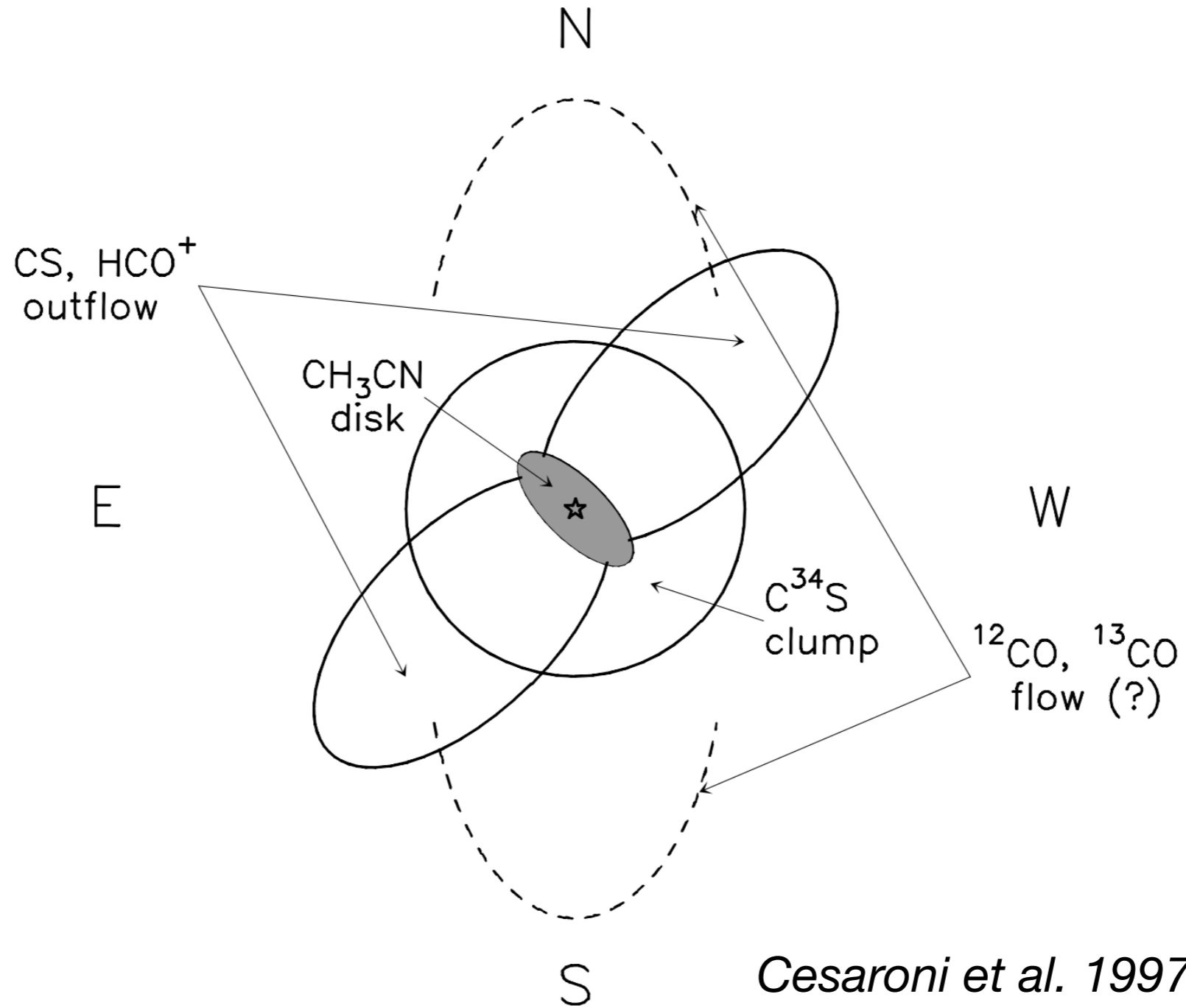
Disk models



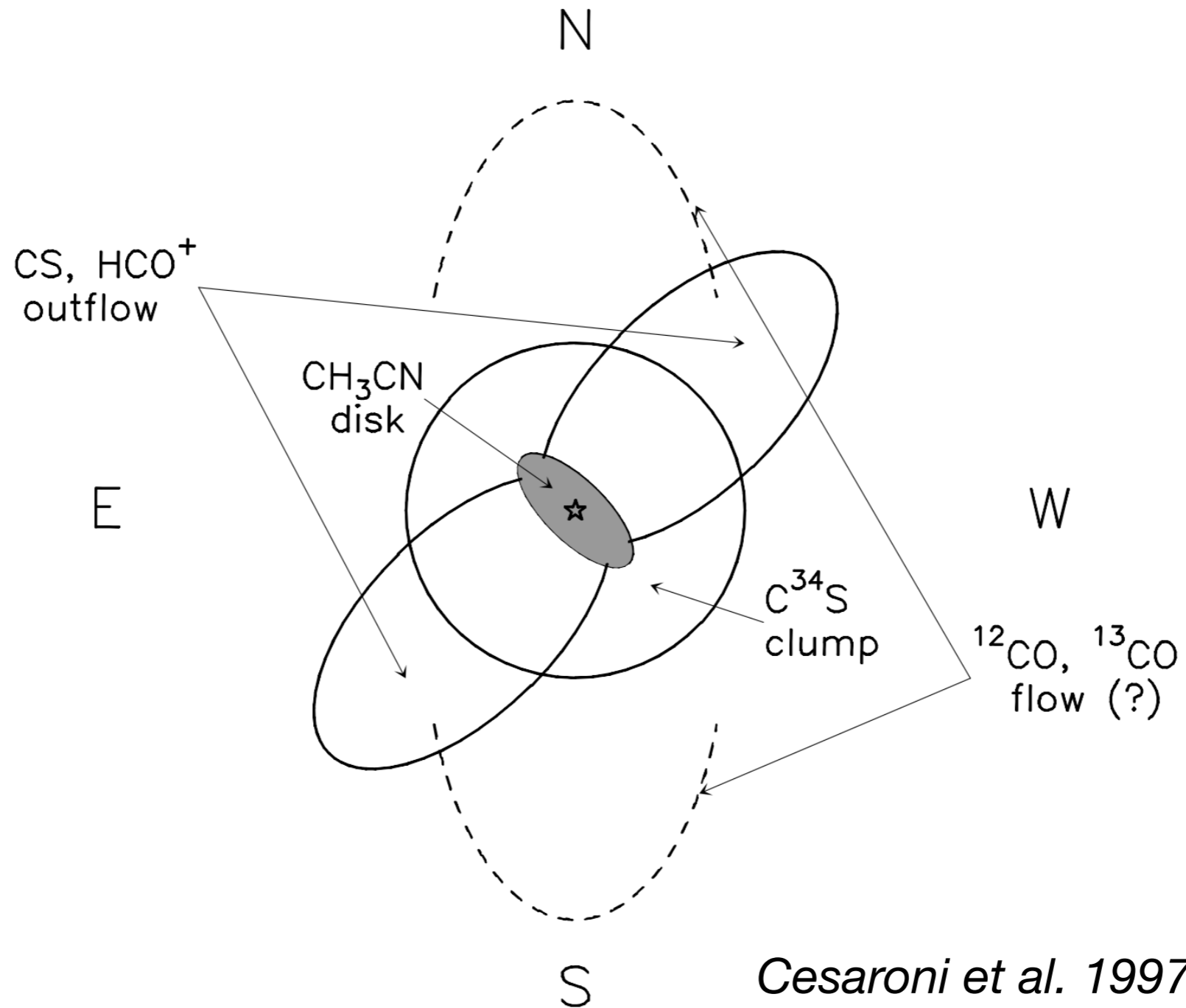
Disk models



Summary



Summary



Still a way to go :-)