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FACULTAD DE CIENCIAS  
FÍSICAS Y MATEMÁTICAS  
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# G305: Looking into a stellar maternity with ALMA

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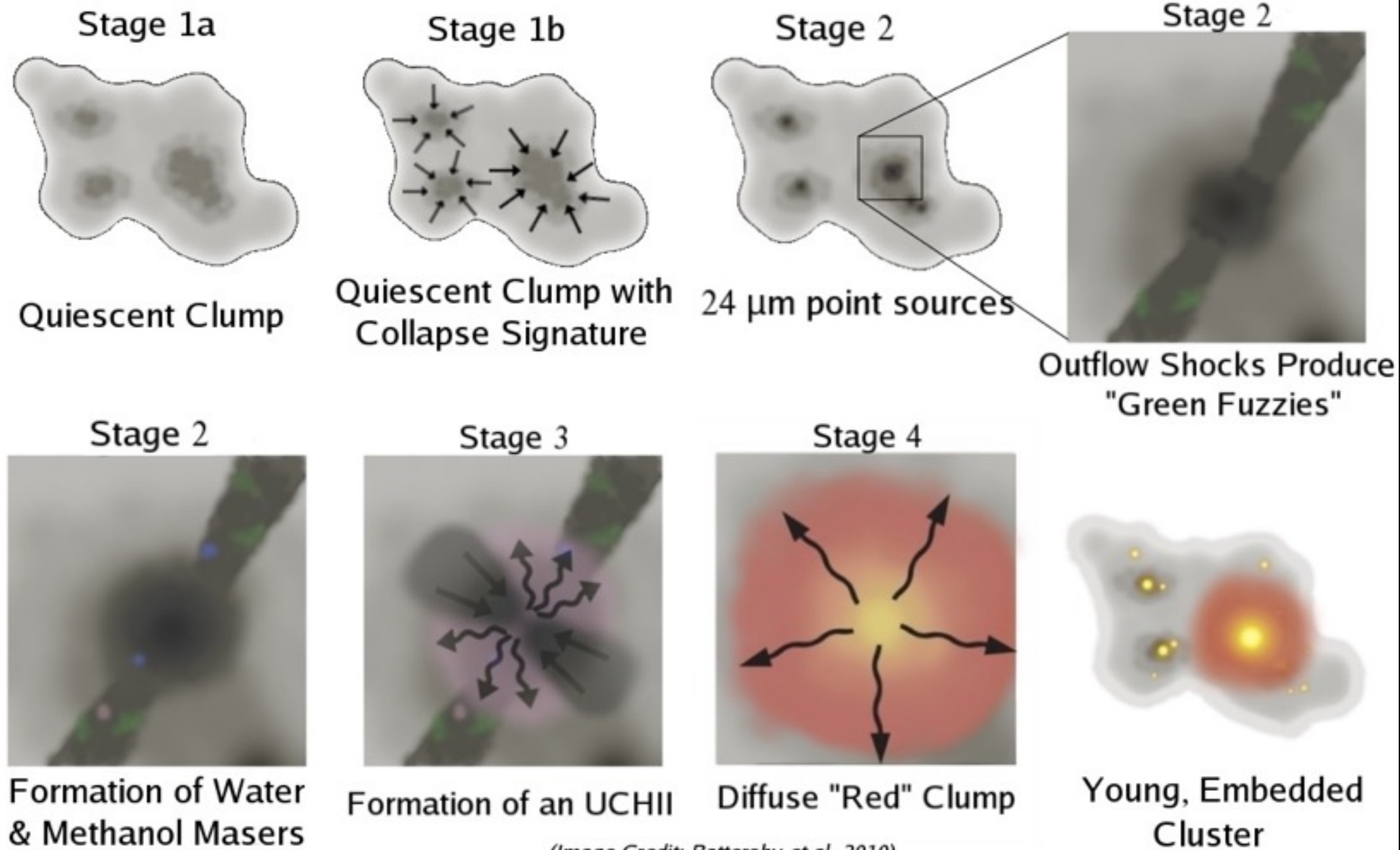


**High mass stars**

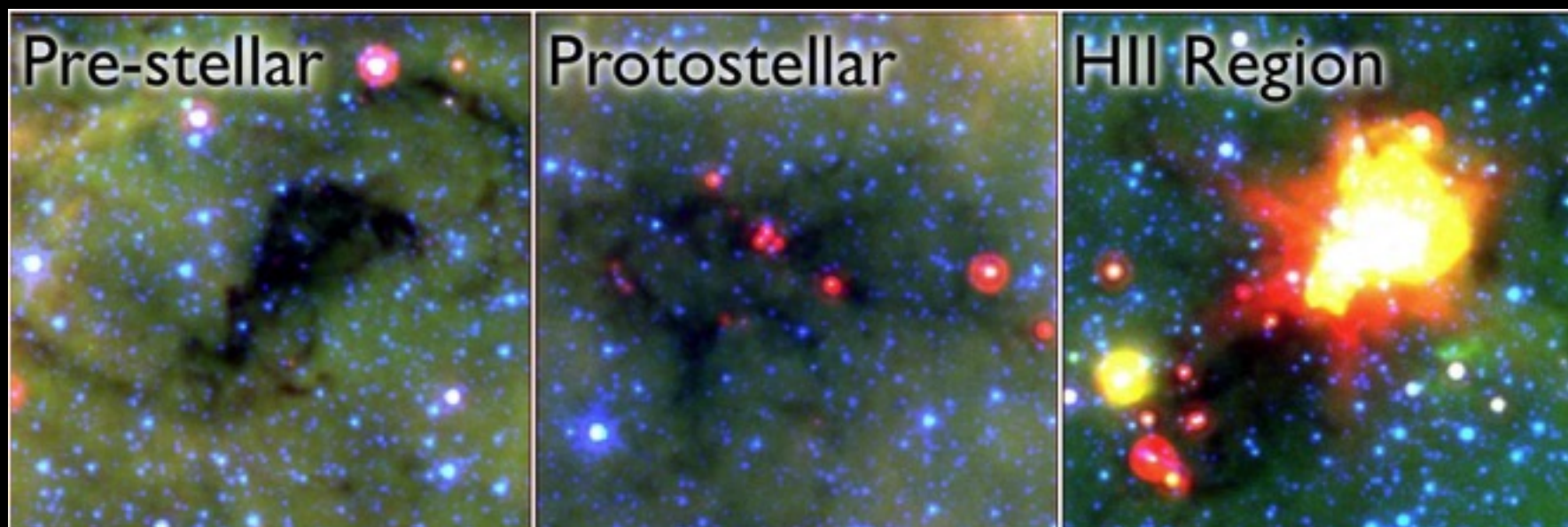
**Form predominantly in clusters**

**Still a lot to understand**



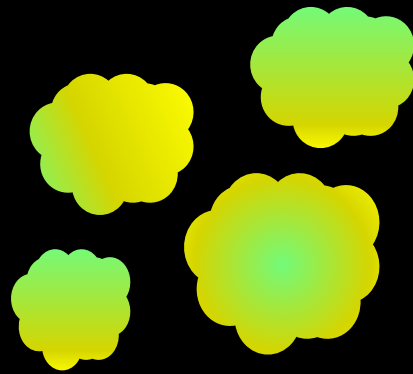
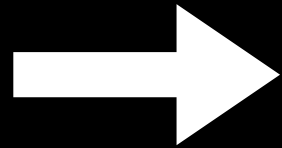


(Image Credit: Battersby et al. 2010)

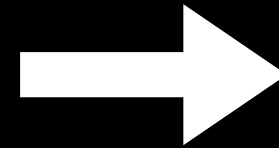




**Clump**



**Cores**



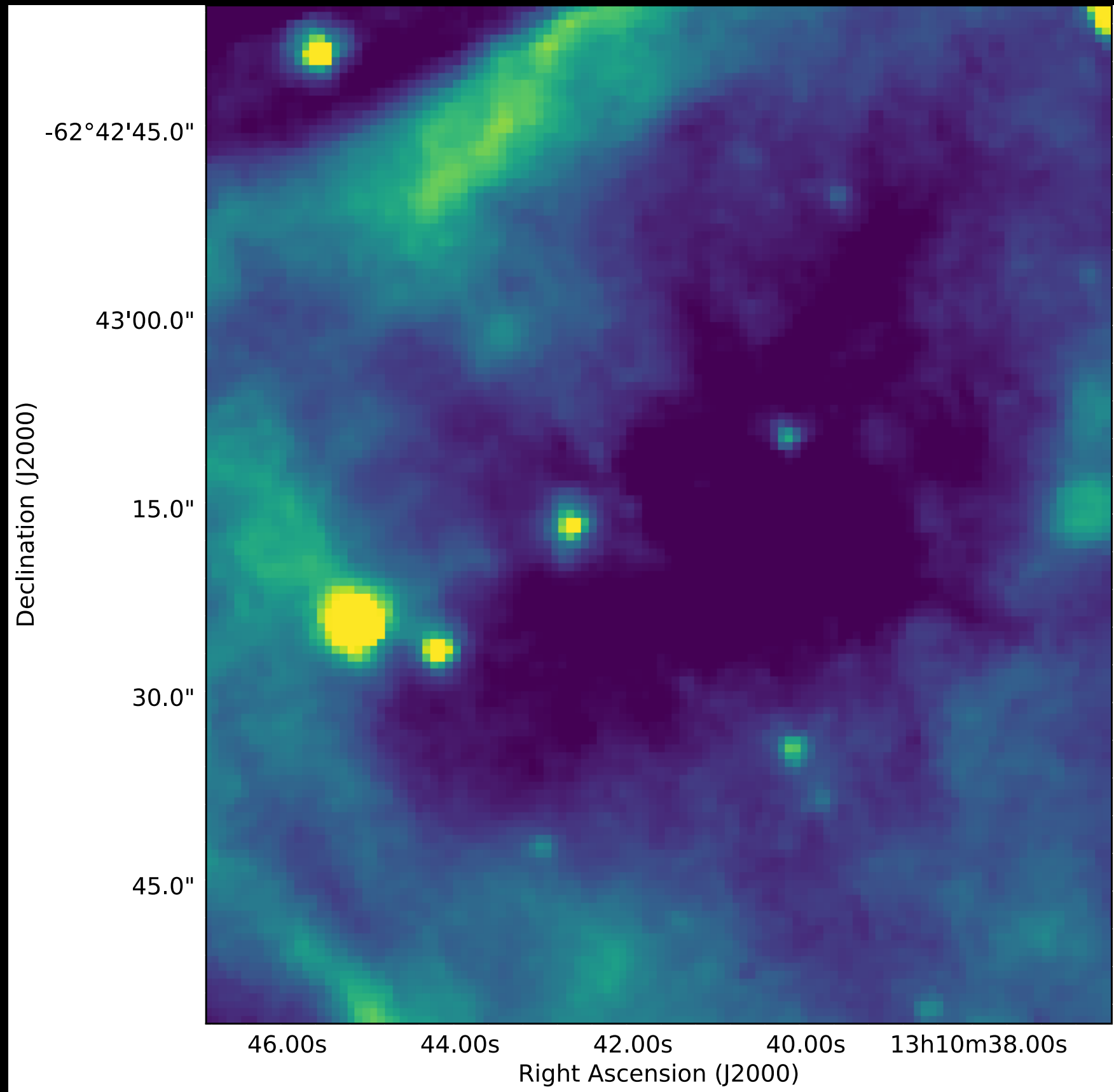
**Cluster of stars**

**Which are the characteristics of the fragmentation at the early stages of evolution?**

**How and where are the most massive stars formed?**



# Looking into G305 with ALMA



# Looking into G305 with ALMA

12m + ACA

2" angular resol.

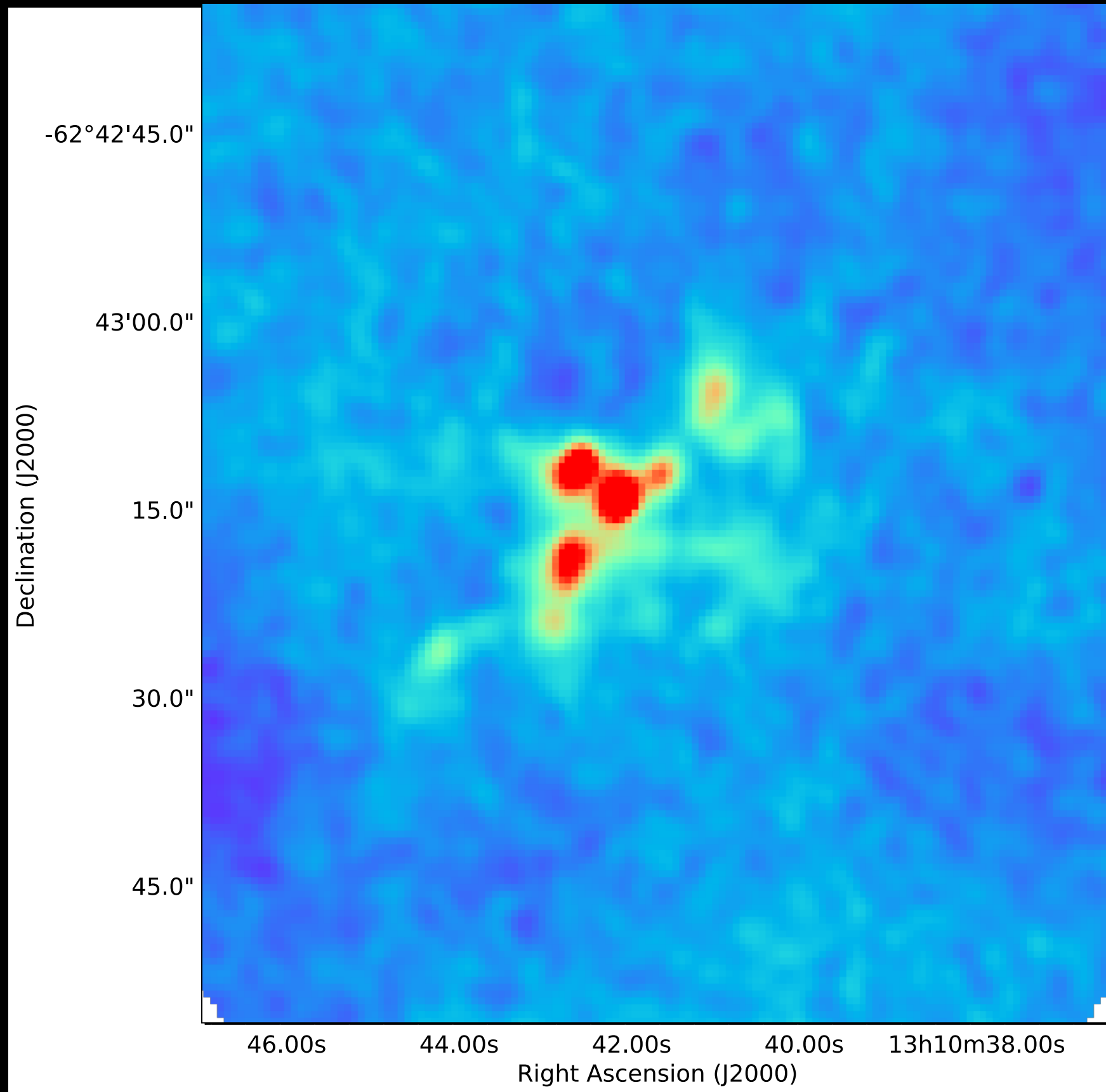
0.4 km/s vel. resol.

Band 3:

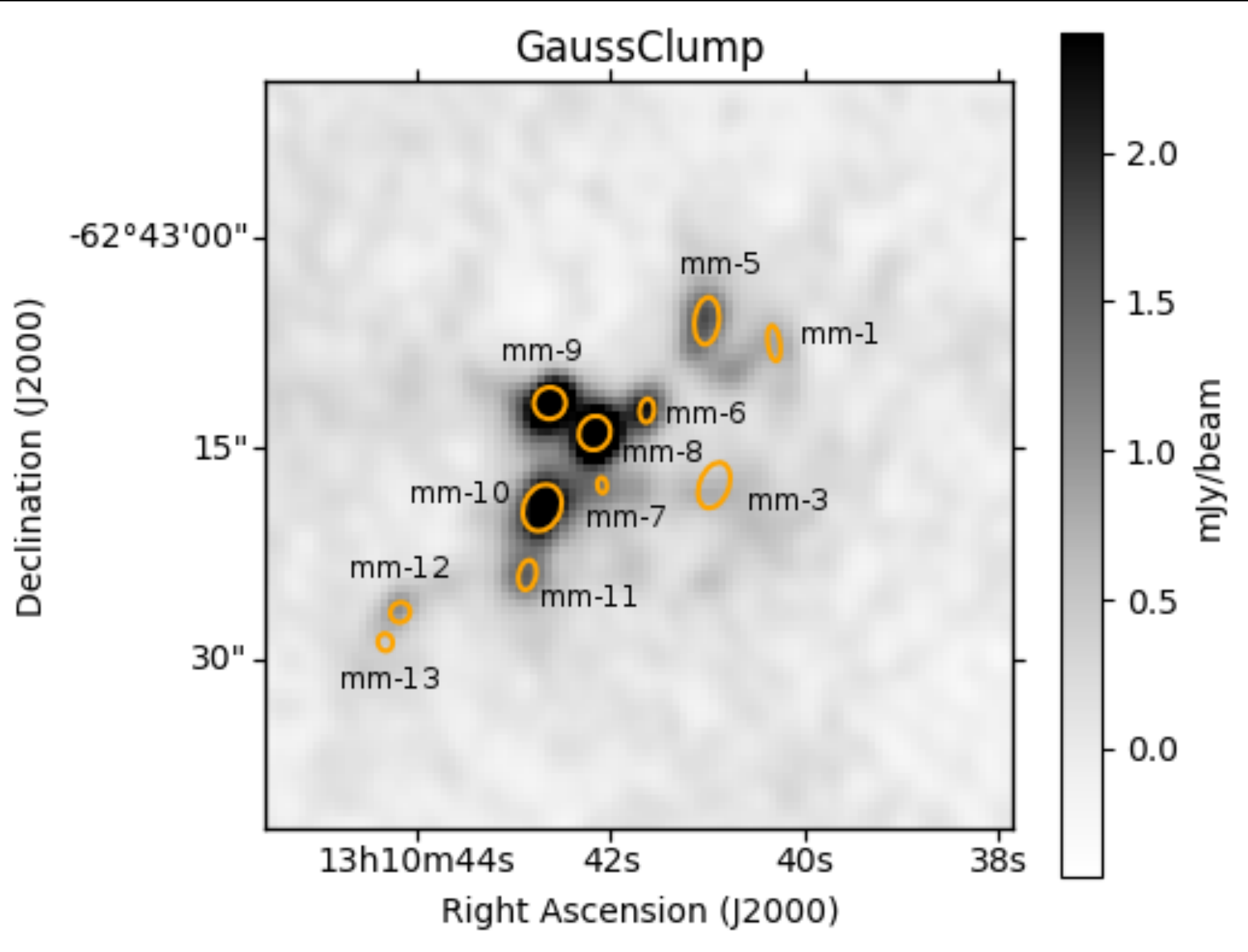
continuum

molecular lines:  $\text{HCO}^+$ ,

$\text{N}_2\text{H}^+$ , CS,  $^{13}\text{CO}$

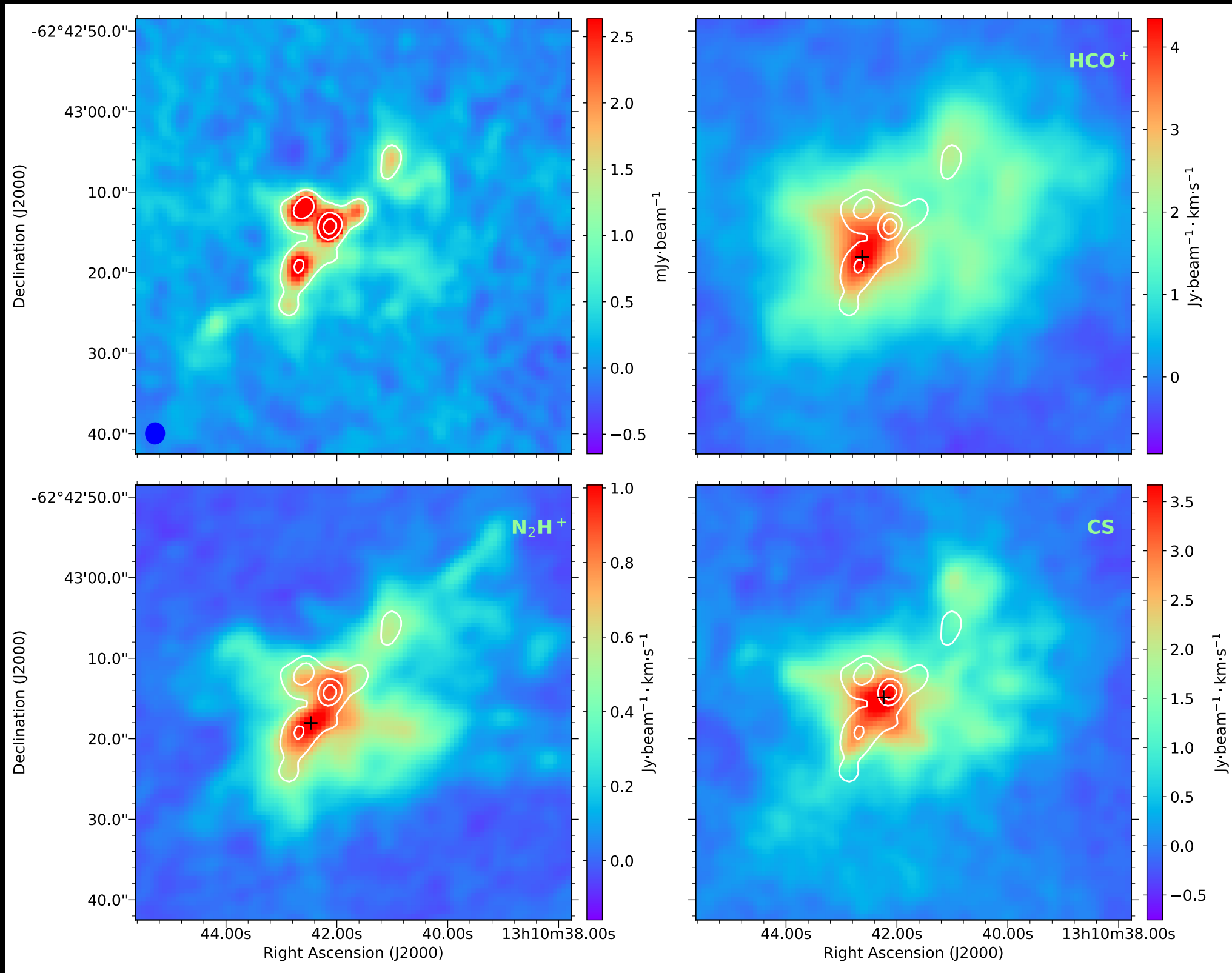


# Continuum emission



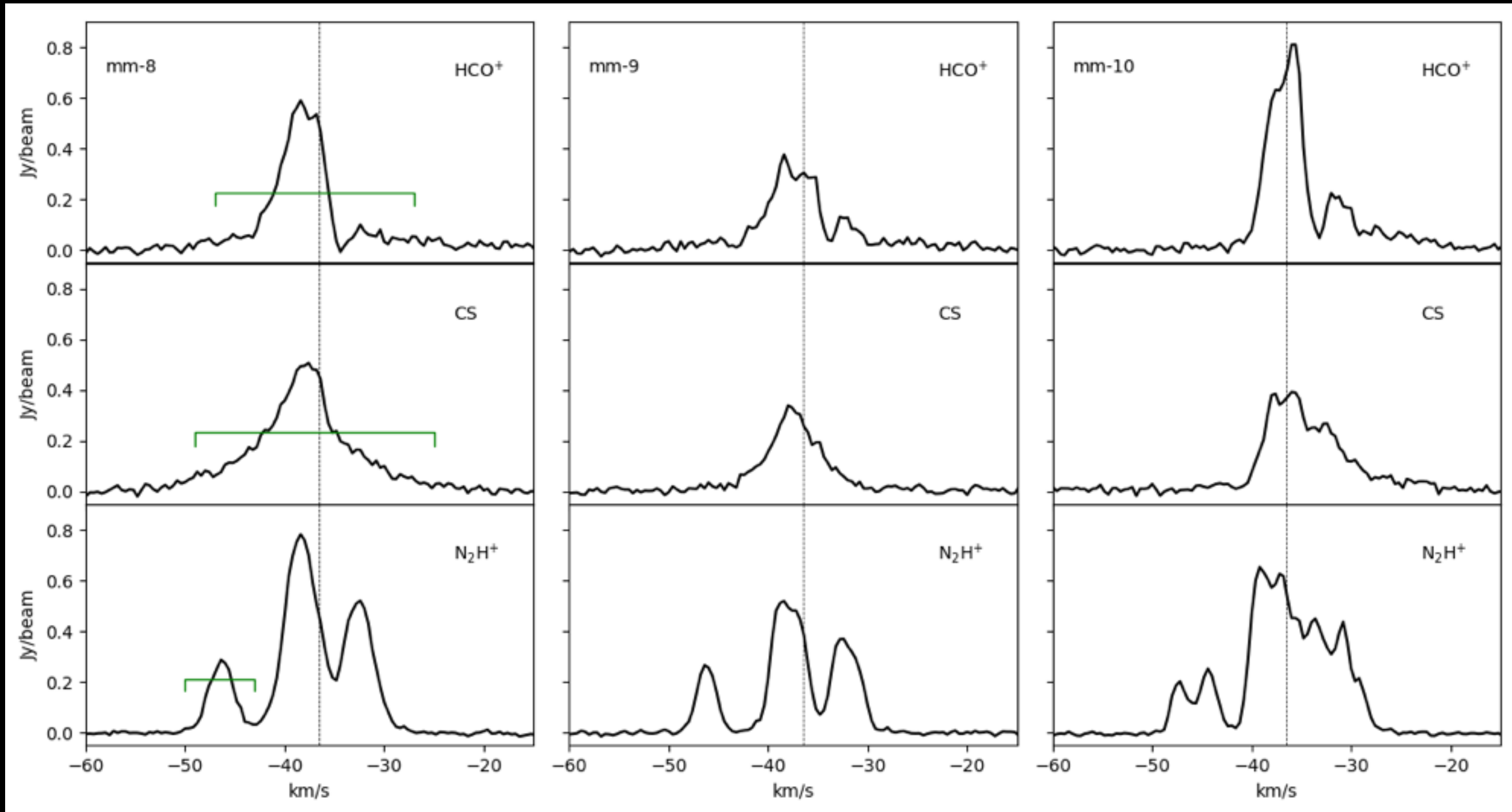
**11 cores:**  
 **$M_d : 4 - 50 M_\odot$**   
 **$R : 0.007 - 0.025 \text{ pc}$**

# Molecular line emission

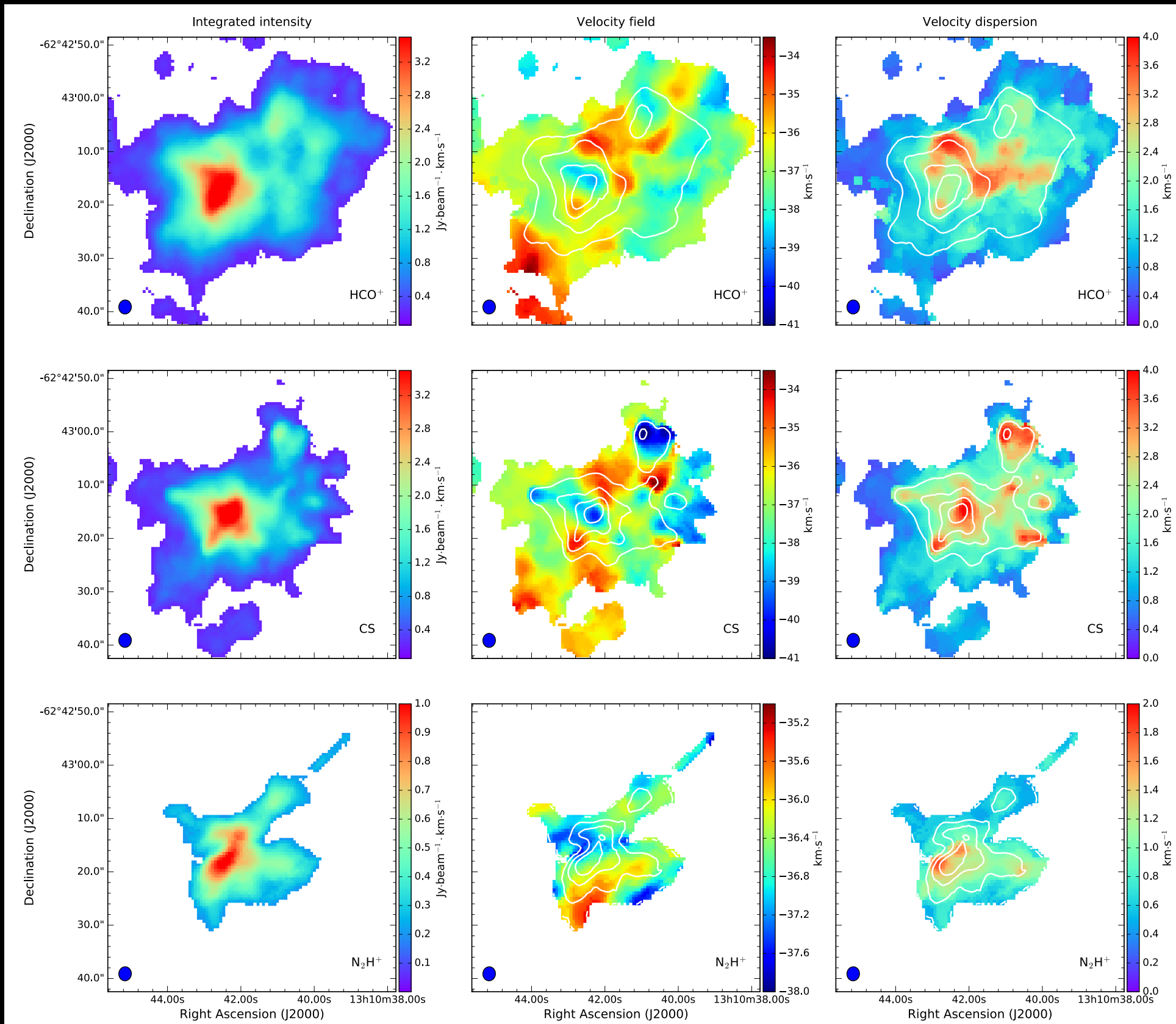




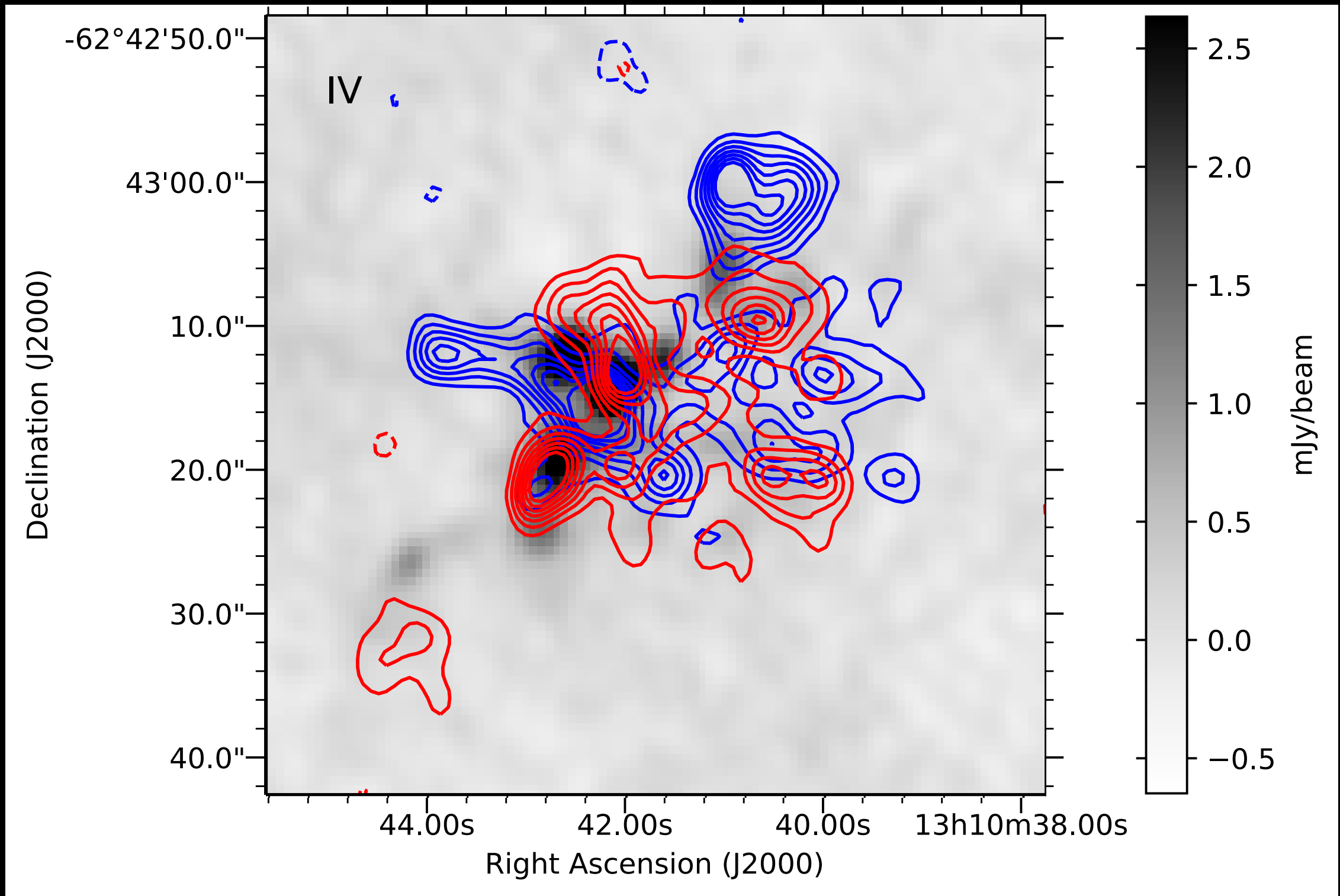
# Molecular line emission



# Molecular line emission

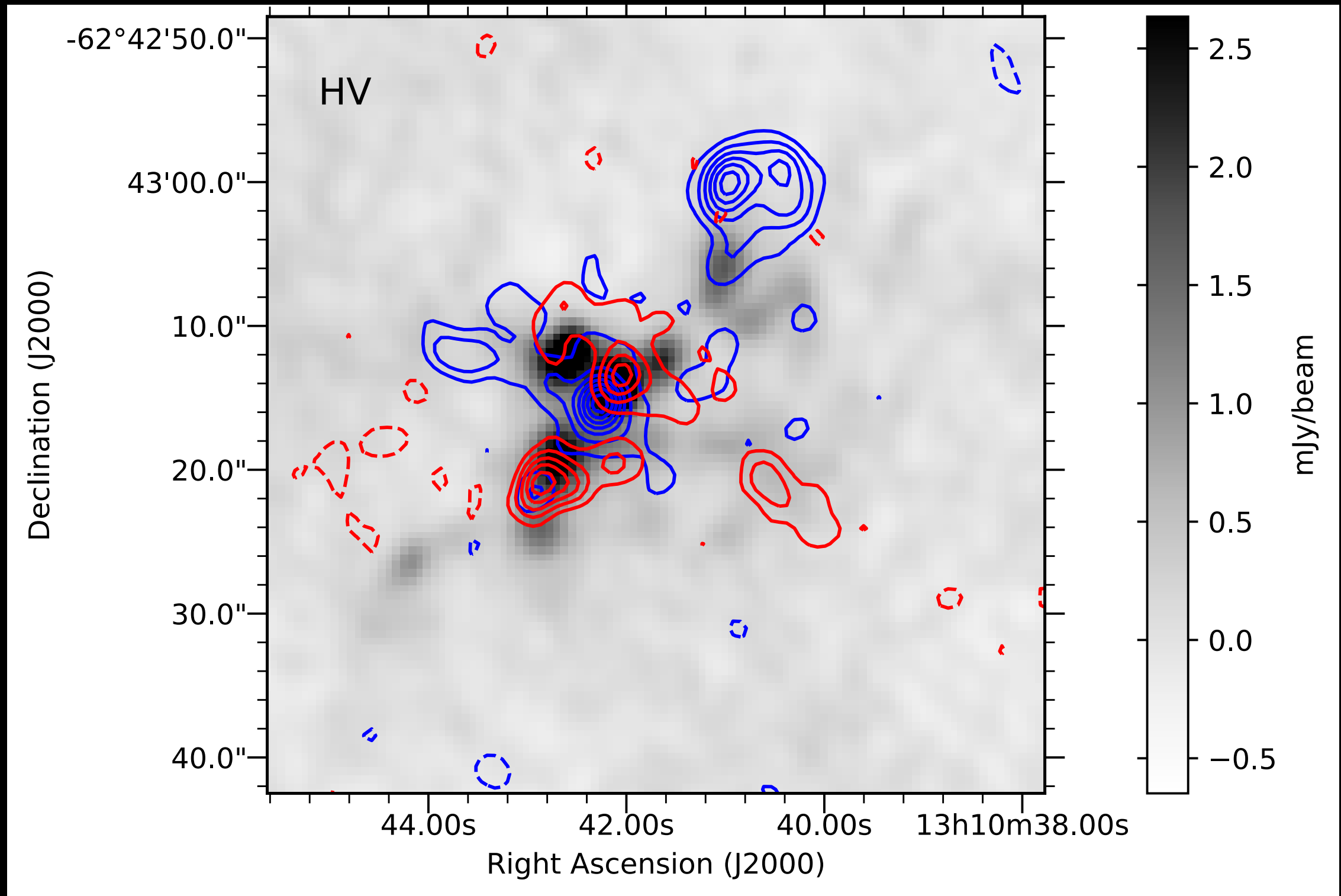


# Molecular line emission

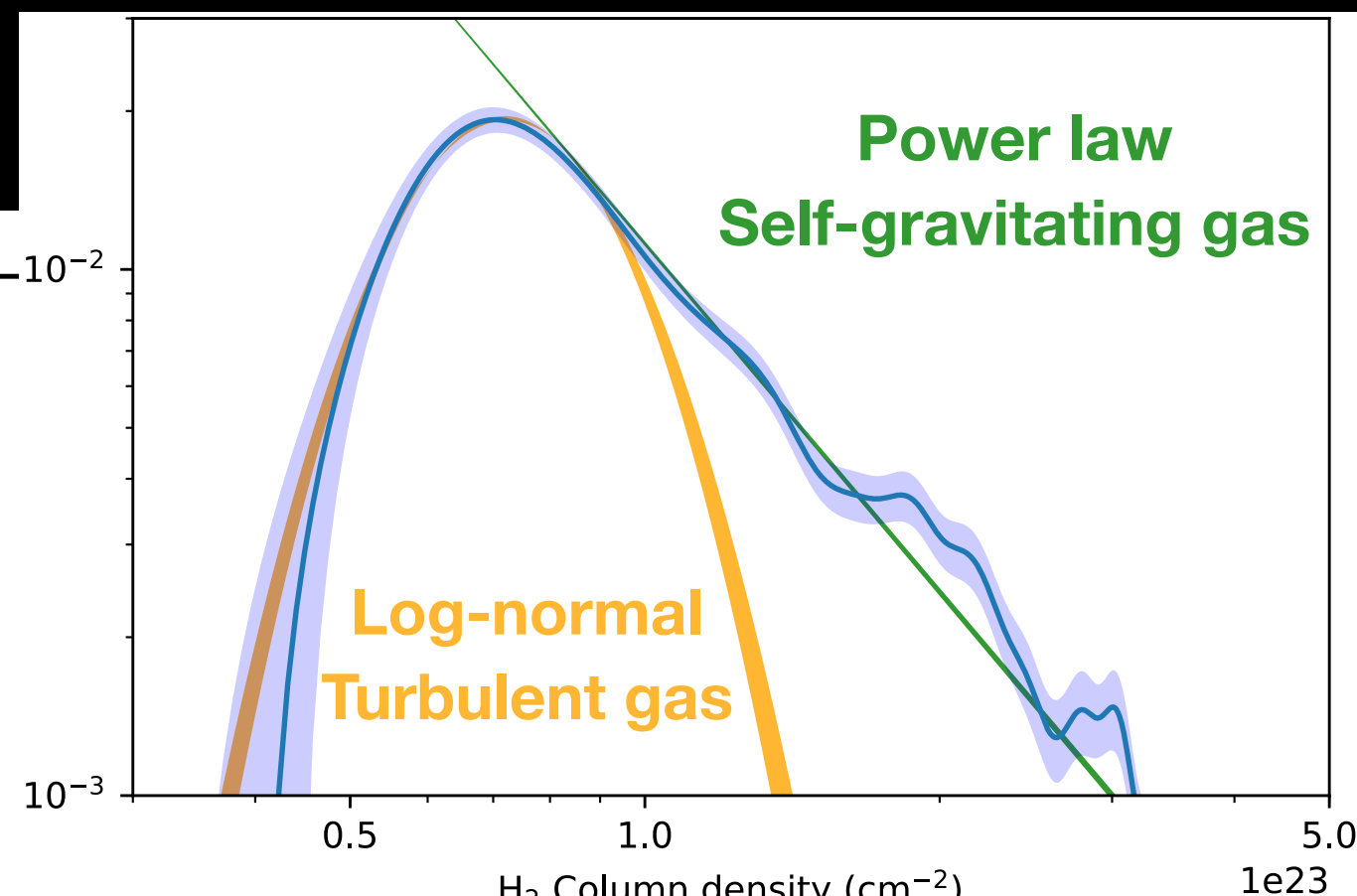
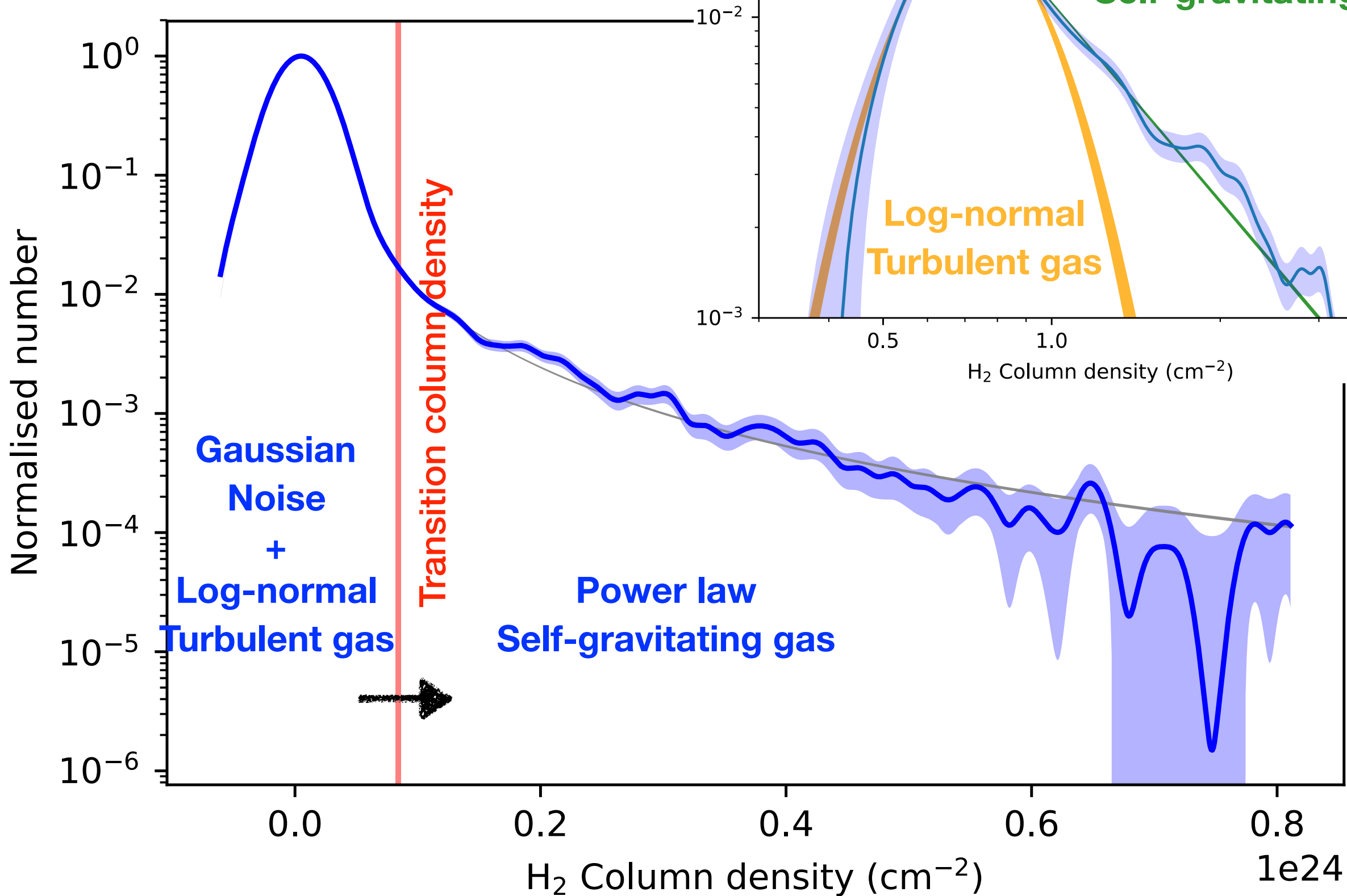




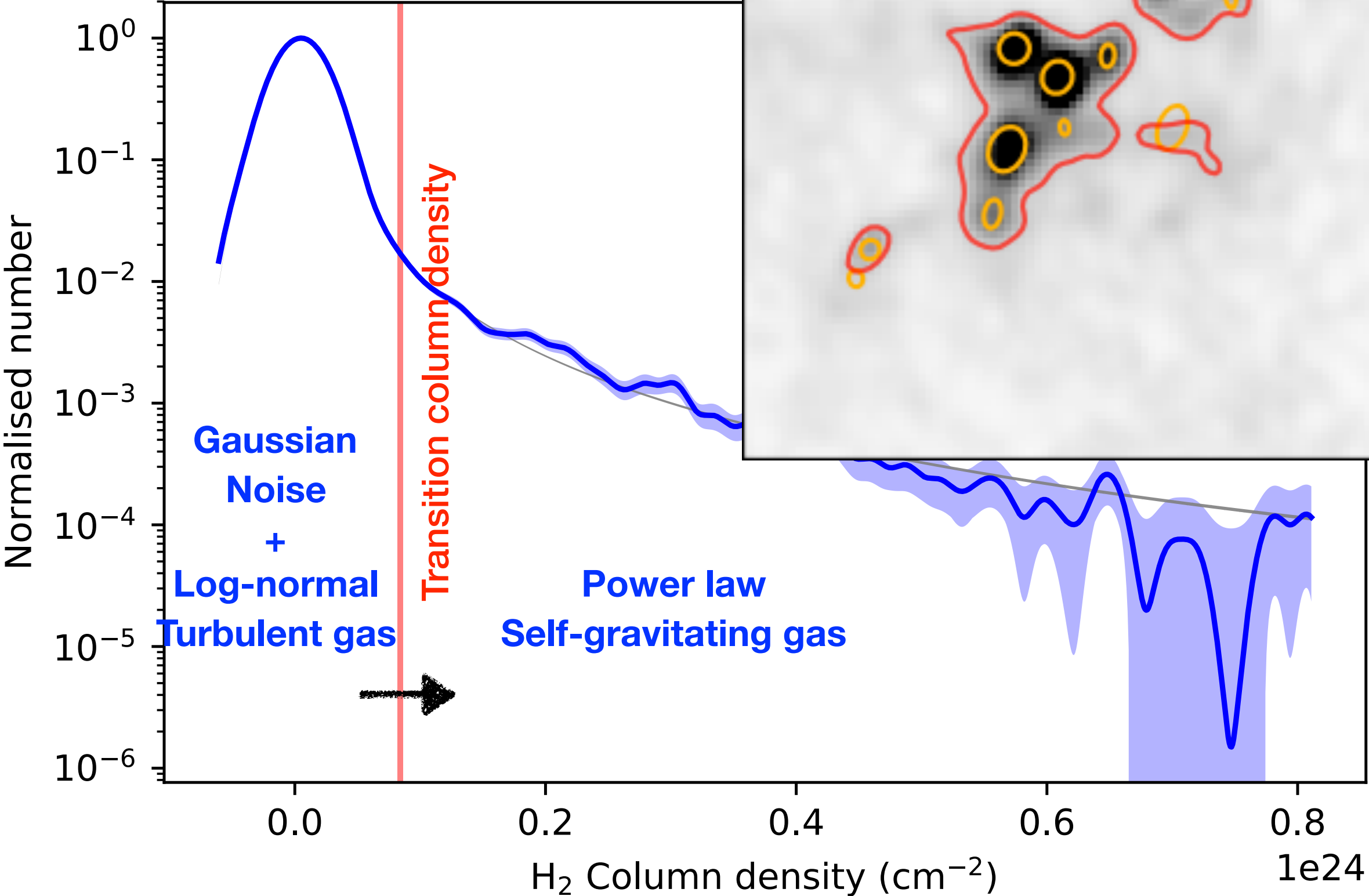
# Molecular line emission



# Self-gravitating gas

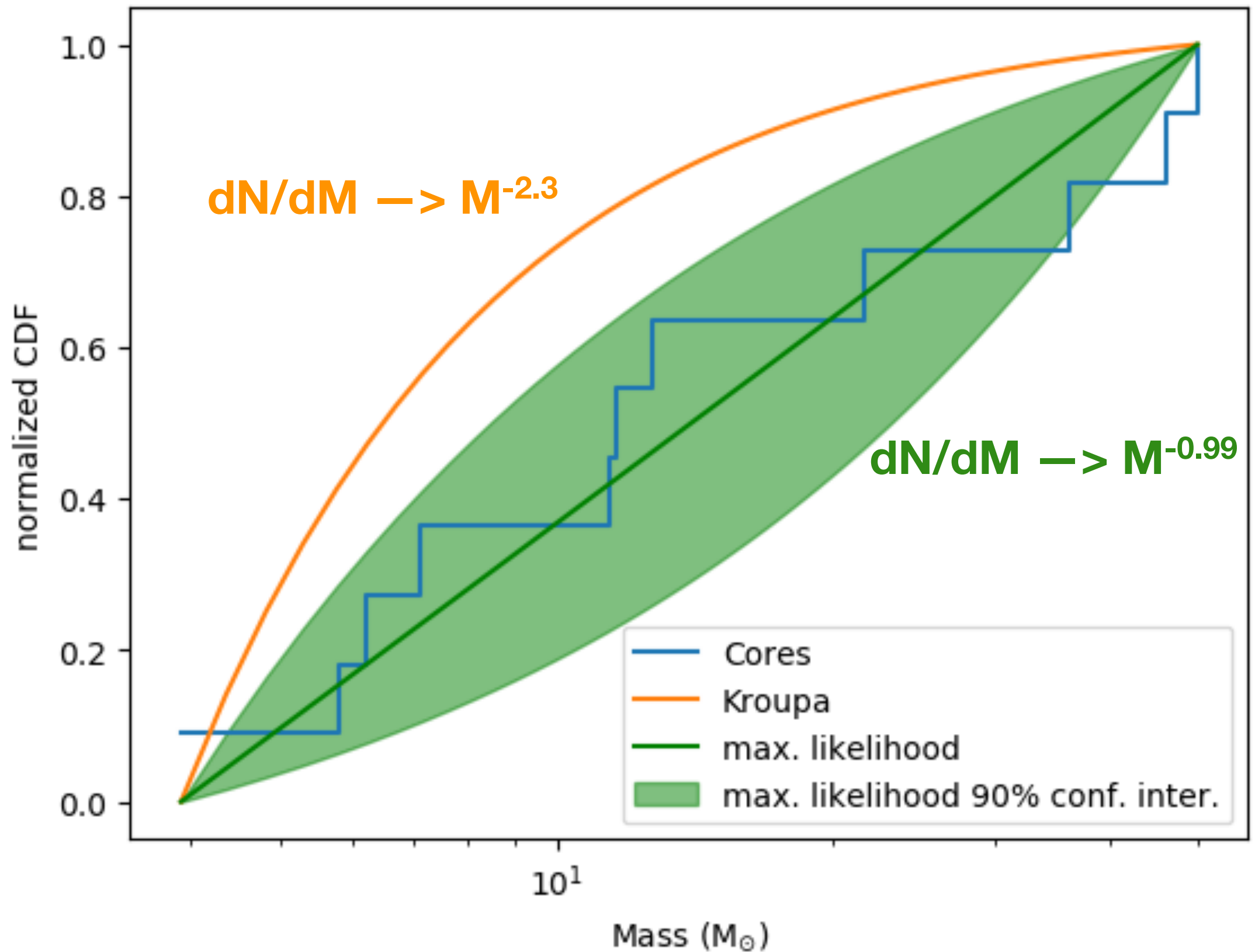


# Self-gravitating gas





# Fragmentation and CMF



# Summary

- ALMA observations show that the clump **fragments** into several cores.
- Eleven **self-gravitating** cores were identified.
- The HV gas kinematics may be explained by **global gravitational collapse** of the clump.
- Based on the physical parameters some of the cores will **form high mass stars**.
- The expected total mass of the cluster is  $\sim 300 M_{\odot}$ , but observed fragments should yield  $\sim 60 M_{\odot}$ .
- Lack of small fragments suggests **top-heavy** CMF at the current fragmentation state.





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