

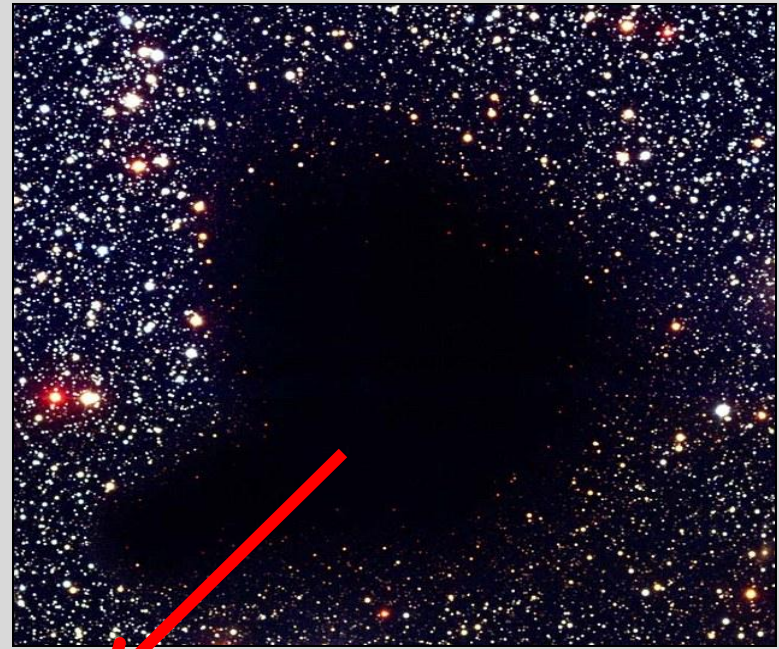
Infall as a Function of Position and Molecular Tracer in Dense Cores

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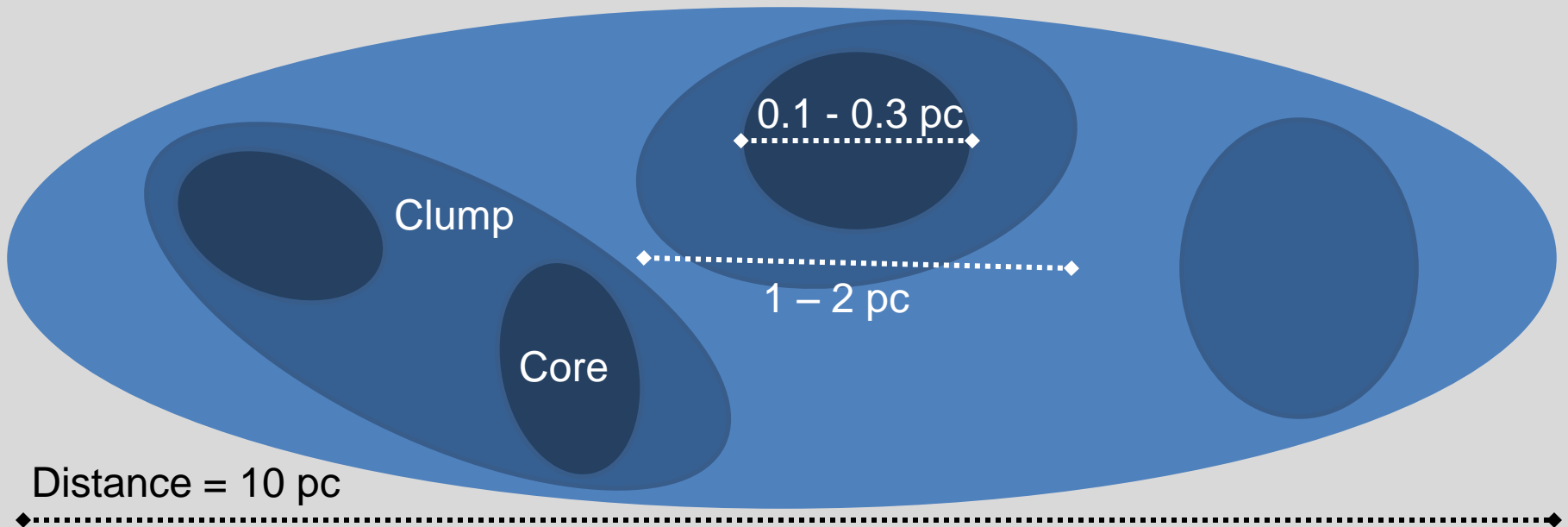
07 August 2013

Birthplace of Stars

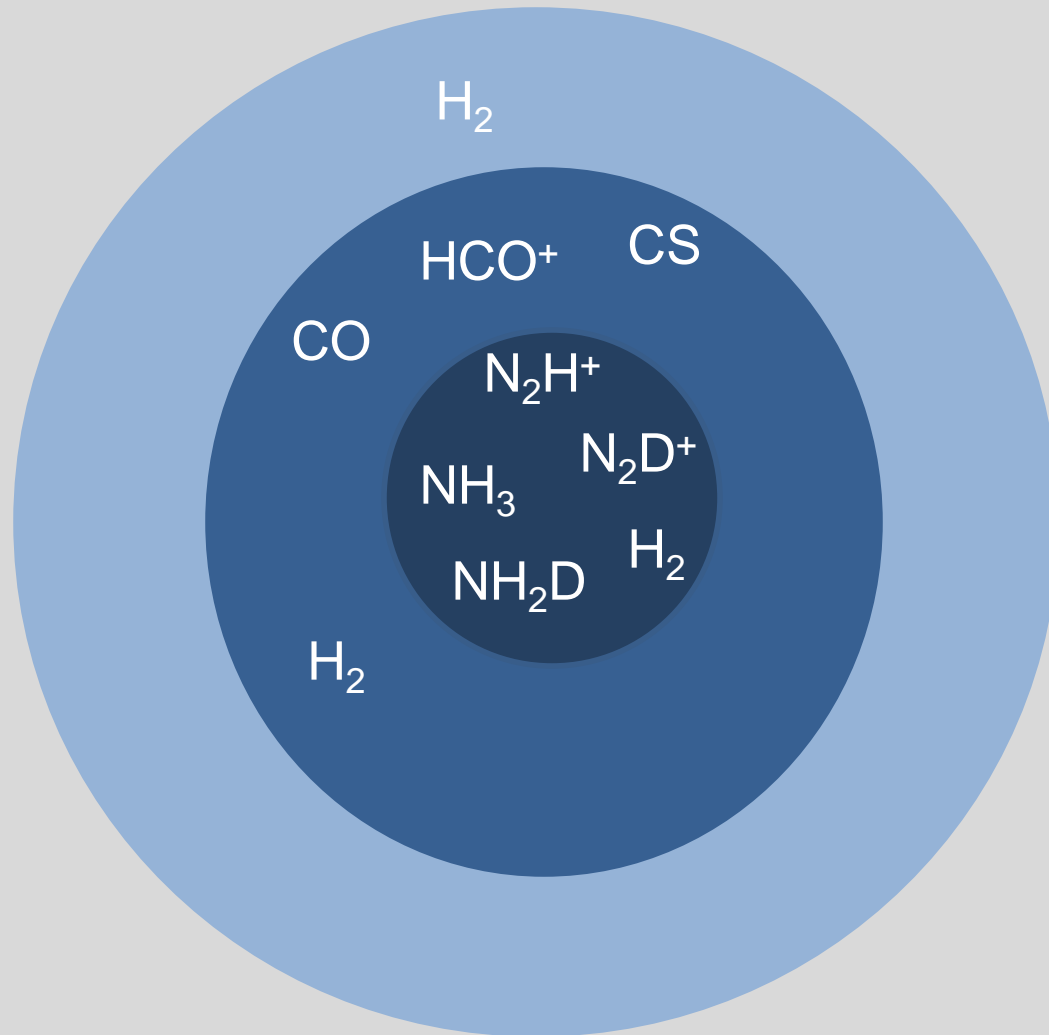
- Stars form in regions of dense gas and dust



Molecular Cloud

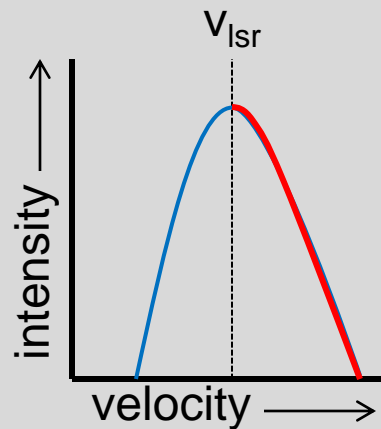


Core Chemistry

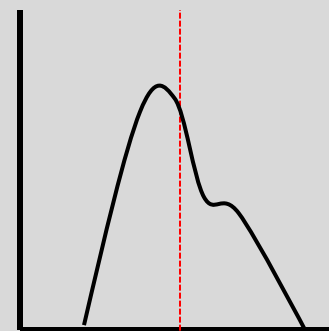
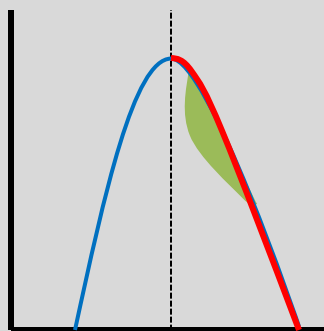
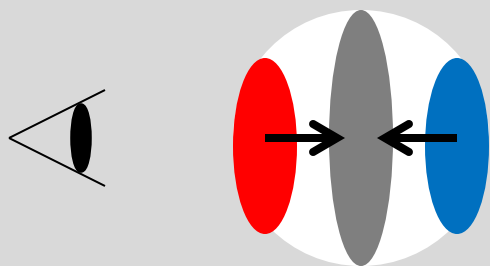


Line Profile Asymmetries

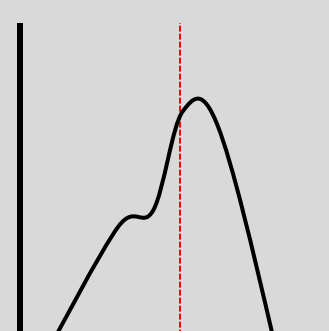
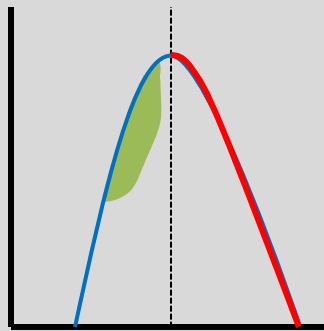
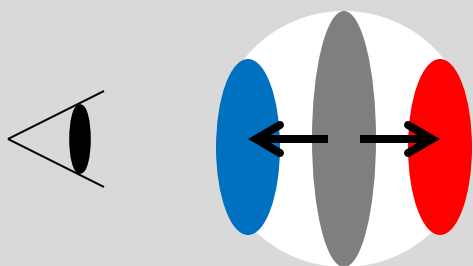
Static



Infall



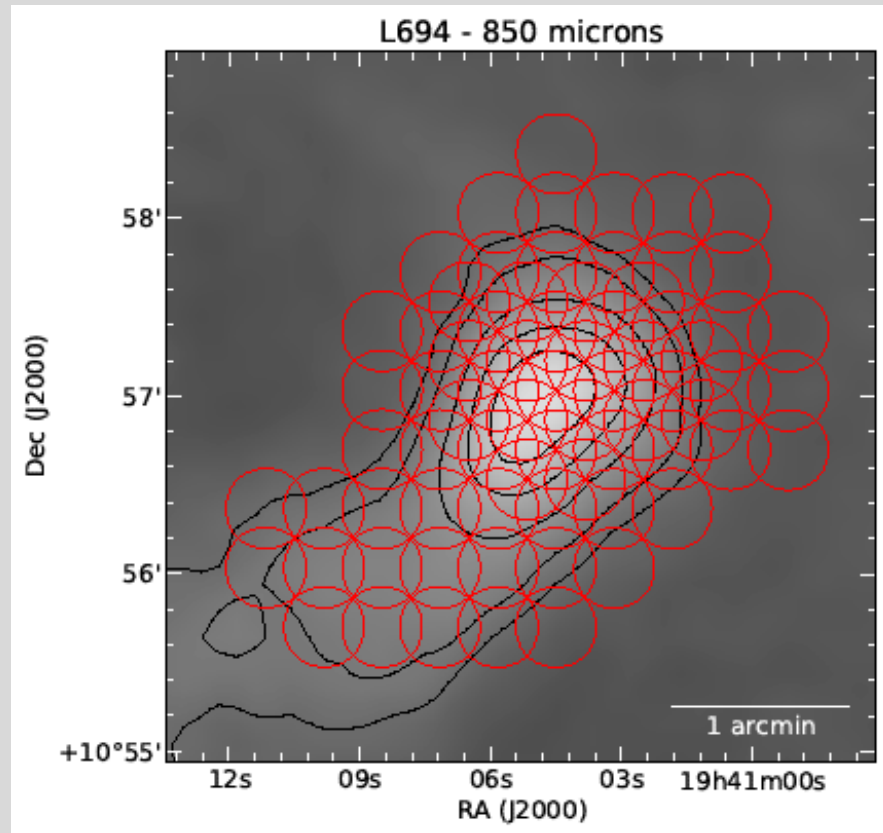
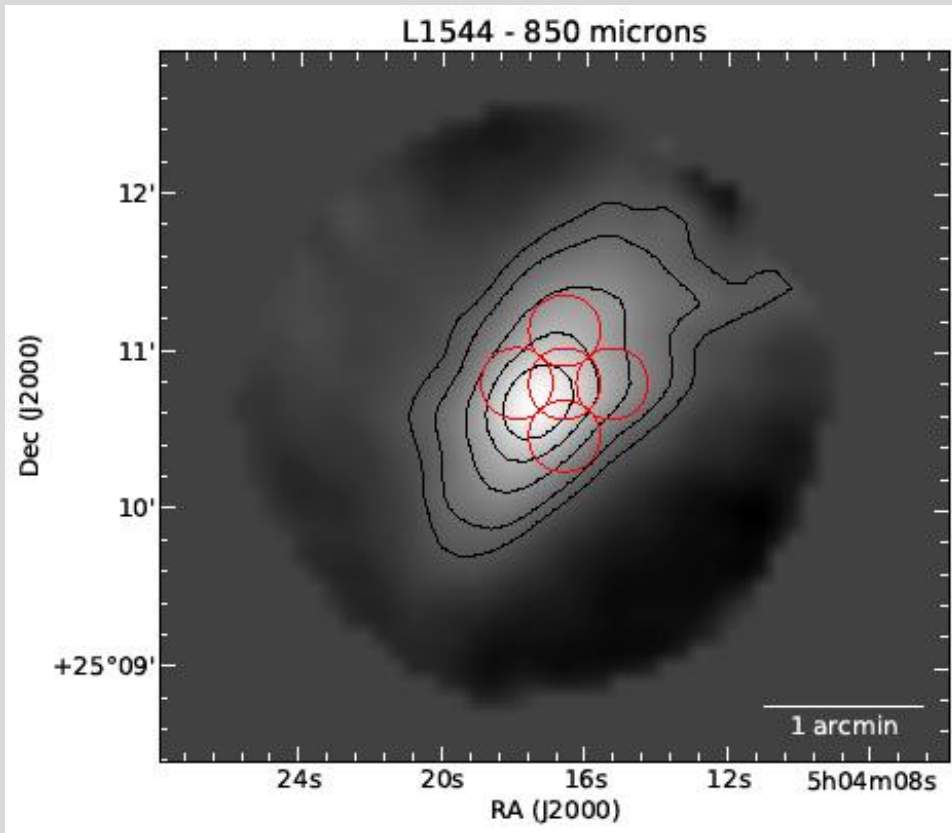
Outflow



Scientific Questions

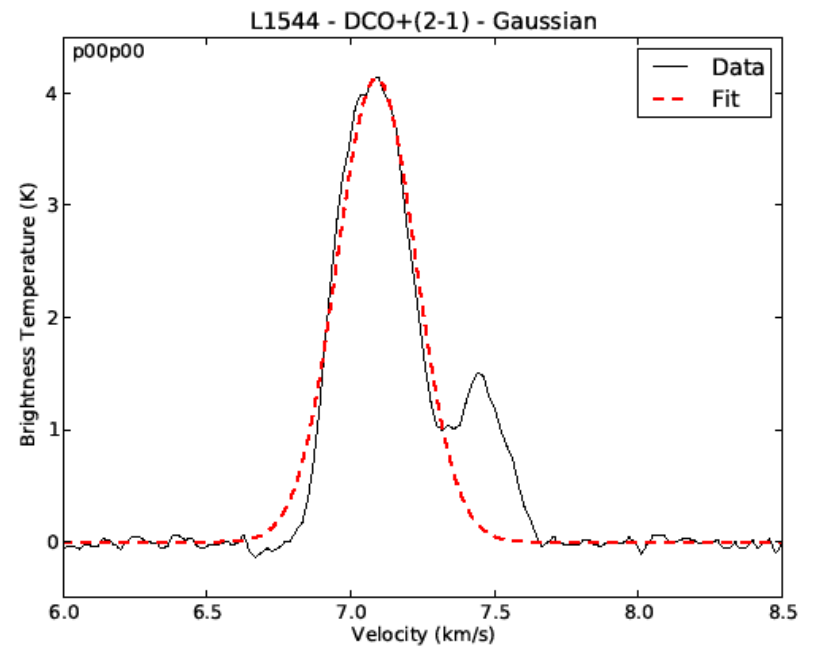
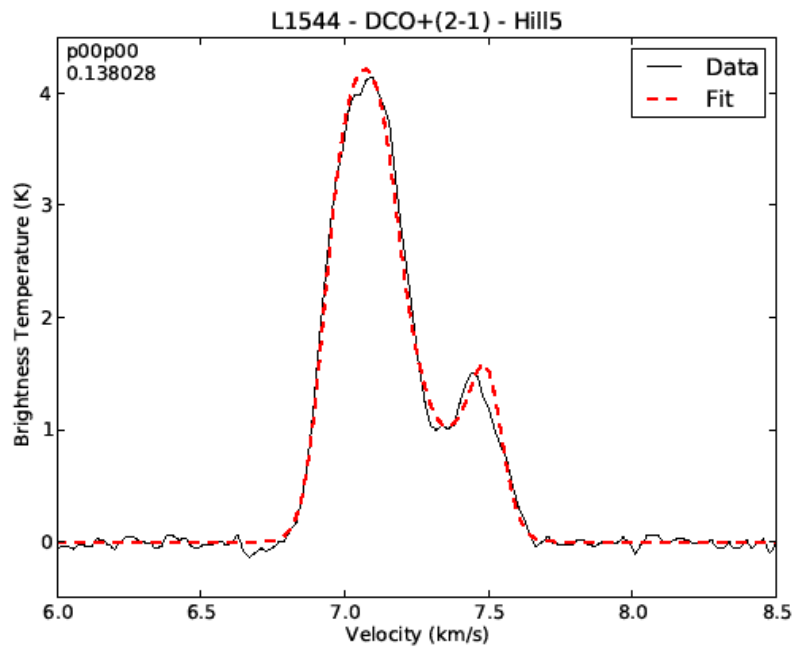
- Does infall depend on the position within a core?
- Does infall depend on the molecular line observed?

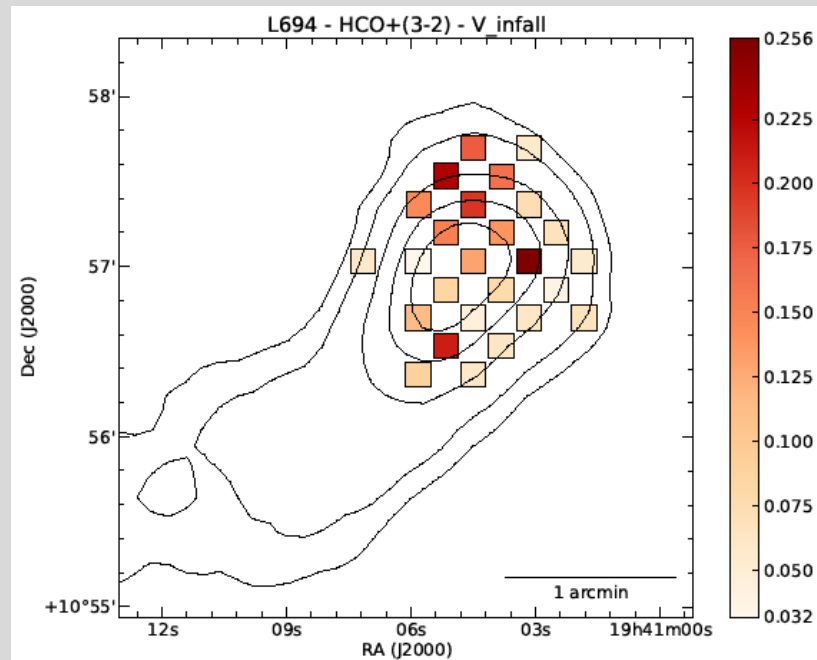
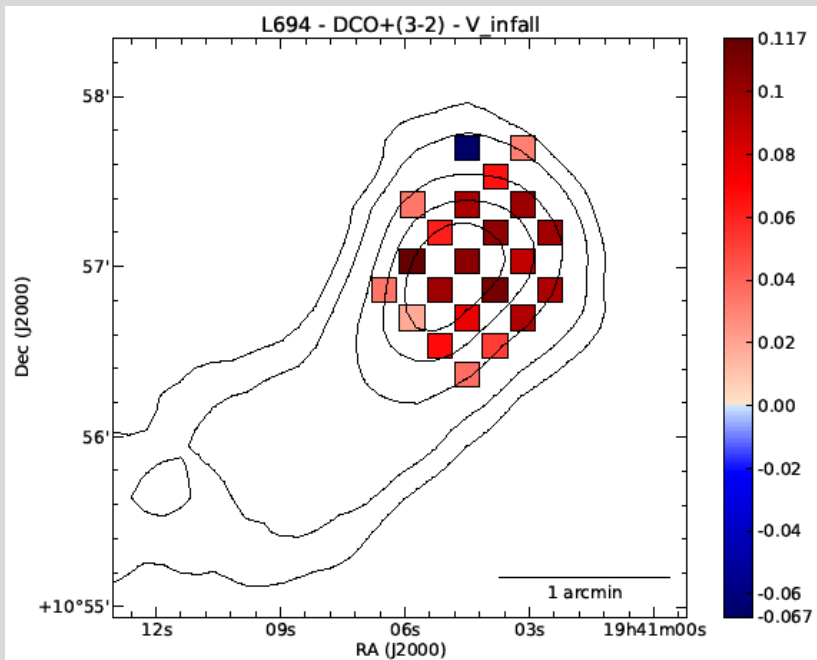
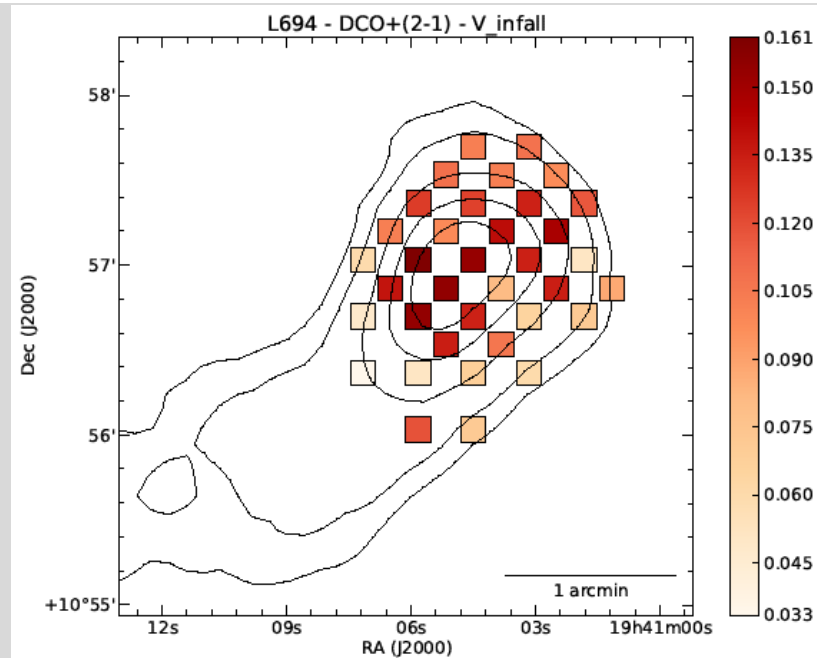
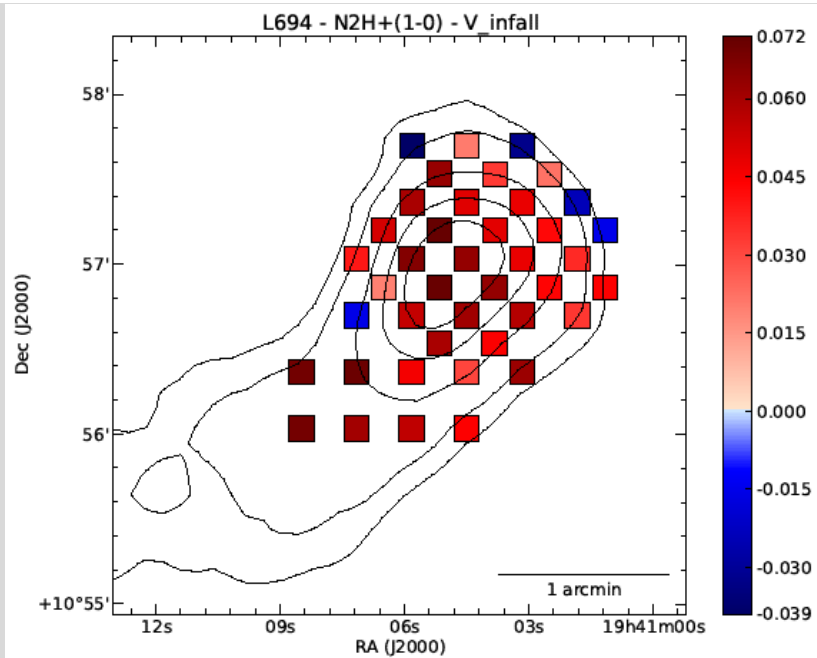
Observations

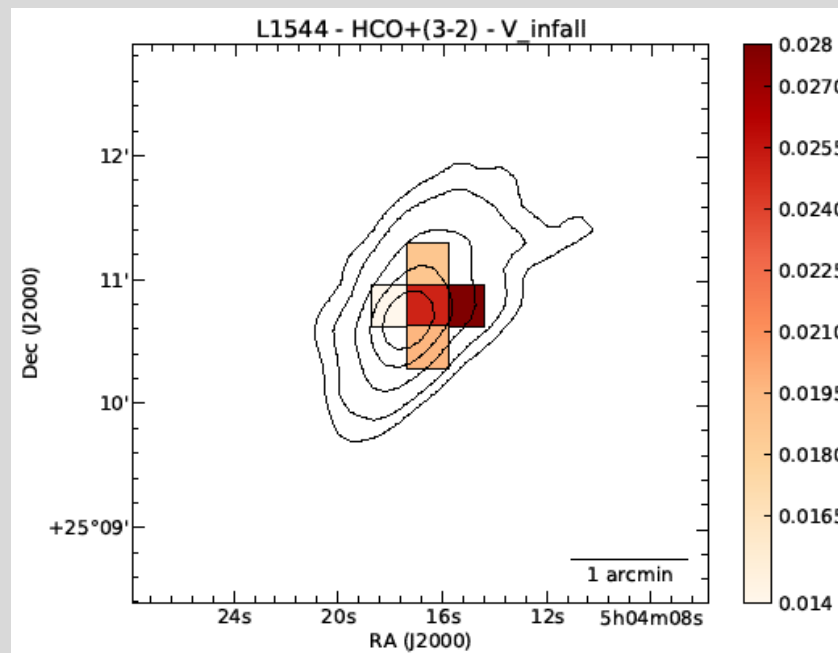
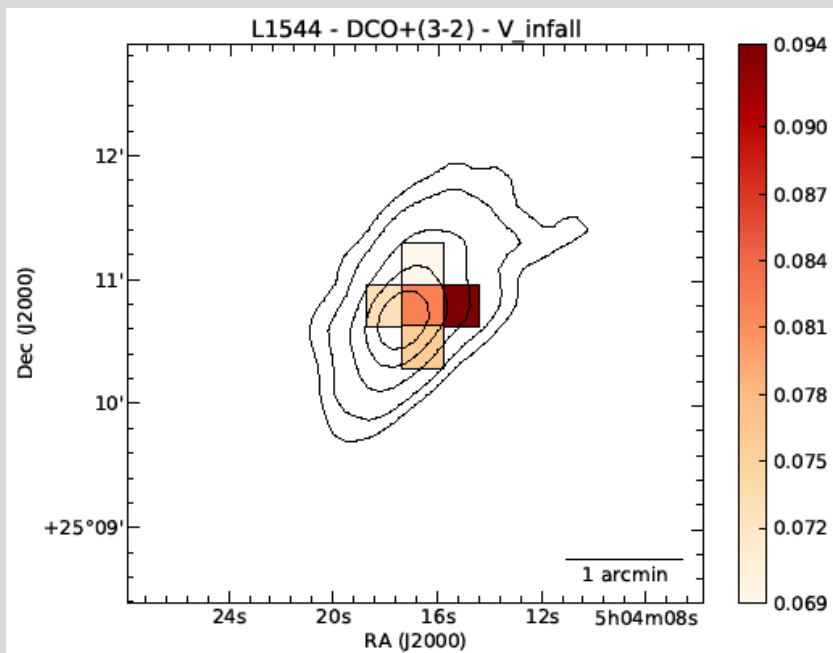
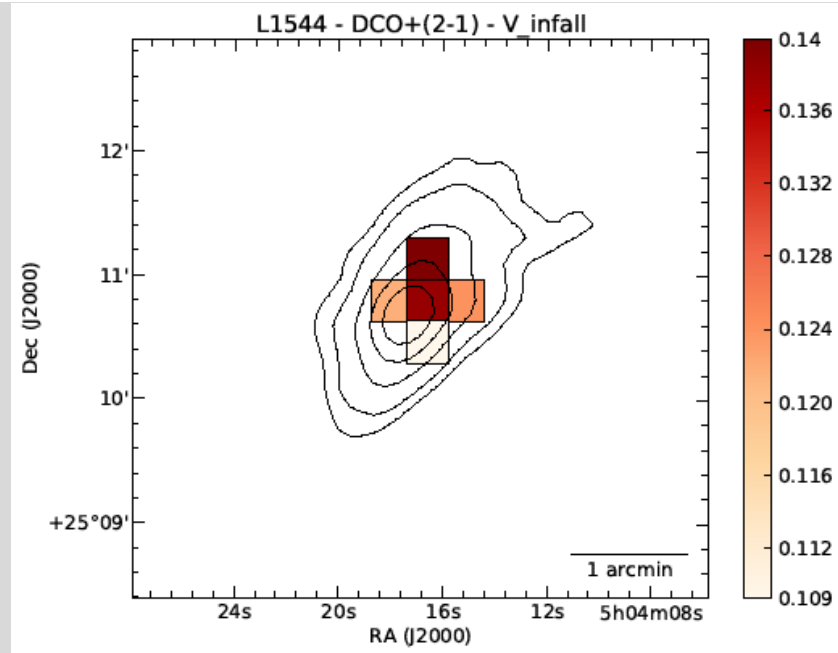
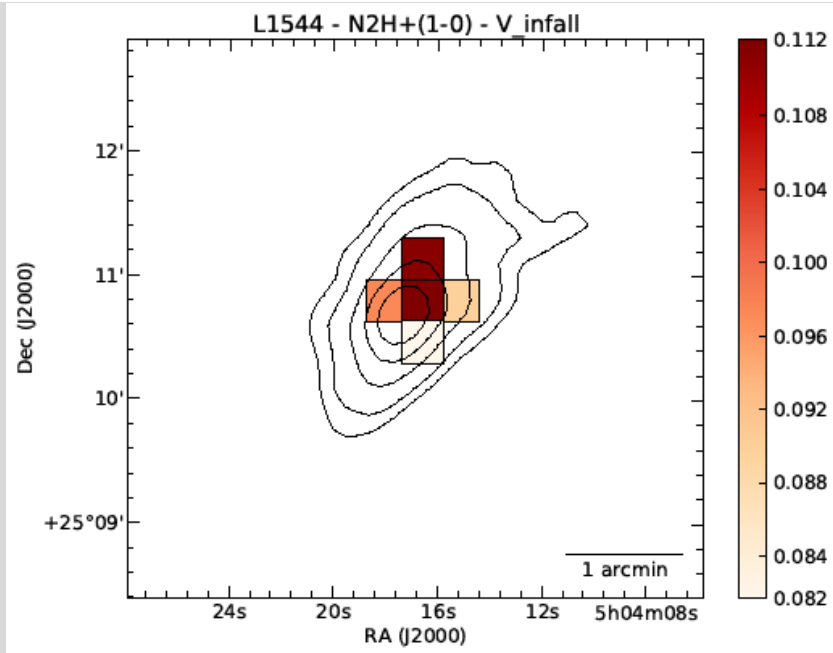


Molecular Lines: $\text{N}_2\text{H}^+(1-0)$ 93174 MHz
 $\text{DCO}^+(2-1)$ 144077 MHz
 $\text{DCO}^+(3-2)$ 216113 MHz
 $\text{HCO}^+(3-2)$ 267558 MHz

Line Fitting







Summary

- Infall varies with position in a core
- Infall varies with the molecular line observed
- Position and molecule don't necessarily matter when determining the presence of infall or outflow
- Position and molecule must be considered when determining core infall speeds

Future Work

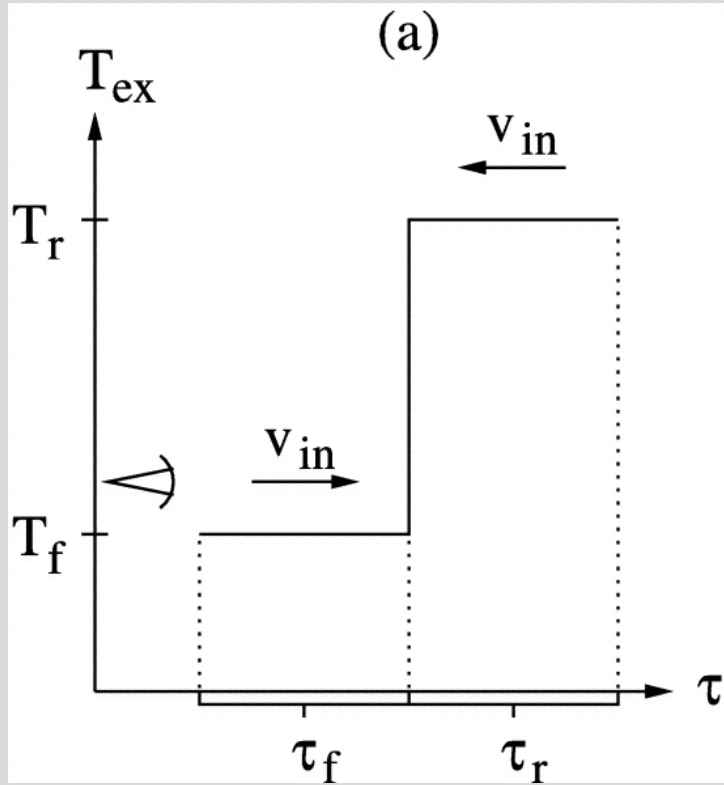
- Develop a new radiative transfer model based on position and molecule

Thank You

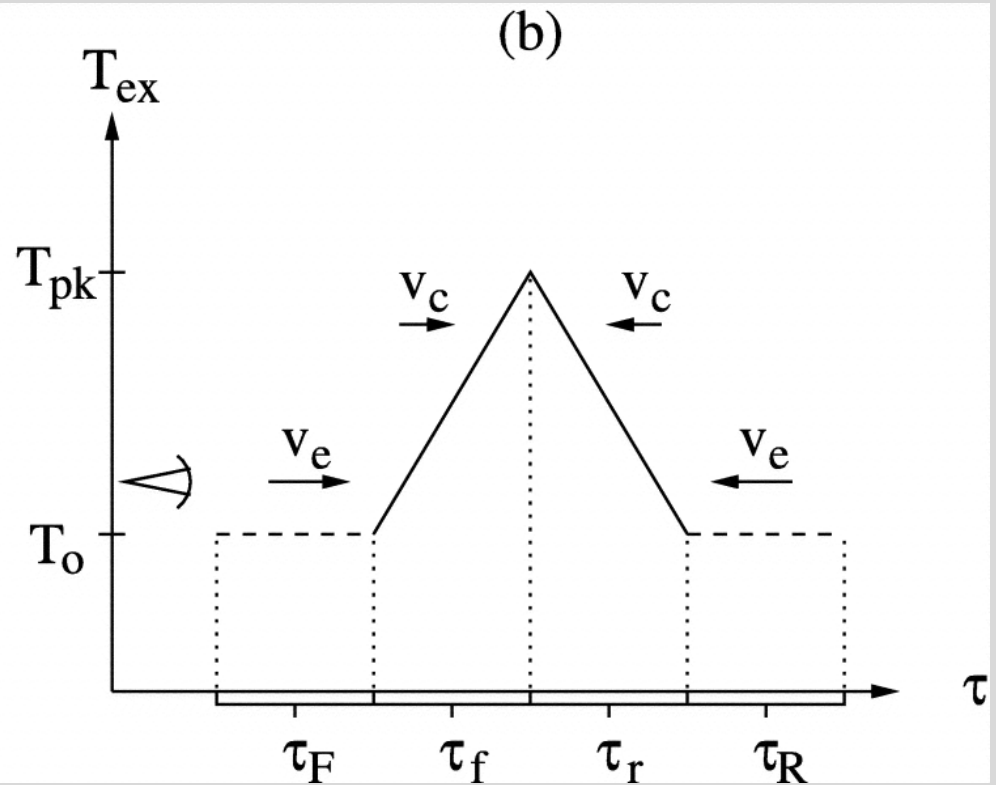
- Advisor: Dr. Scott Schnee
- NRAO Summer Student Program

Infall Models

Two Layer

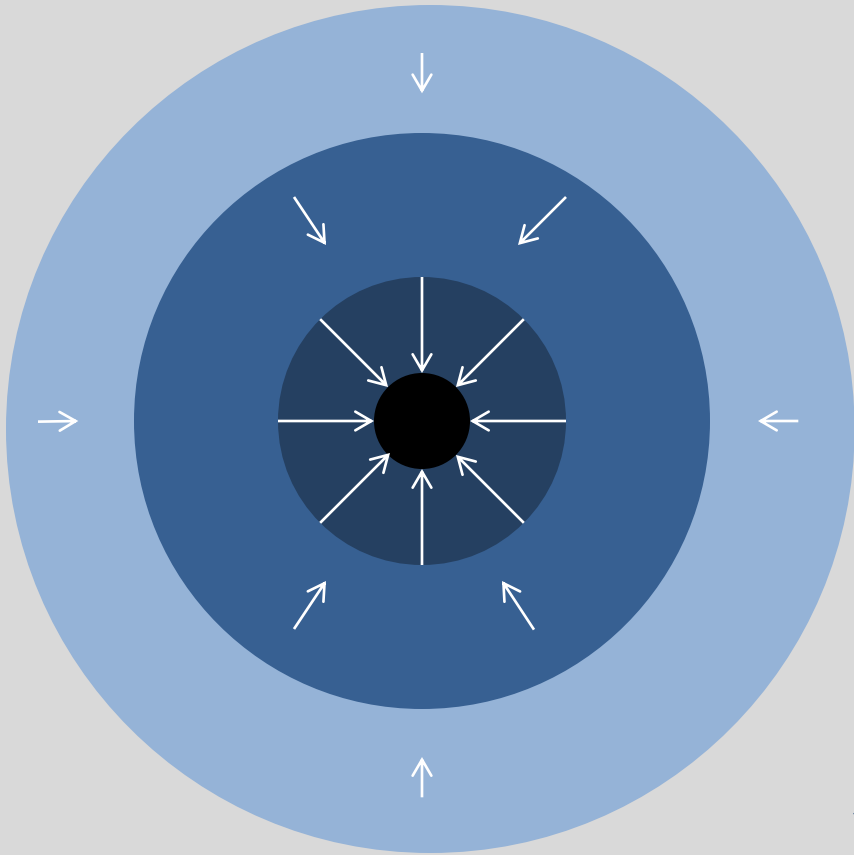


HILL5

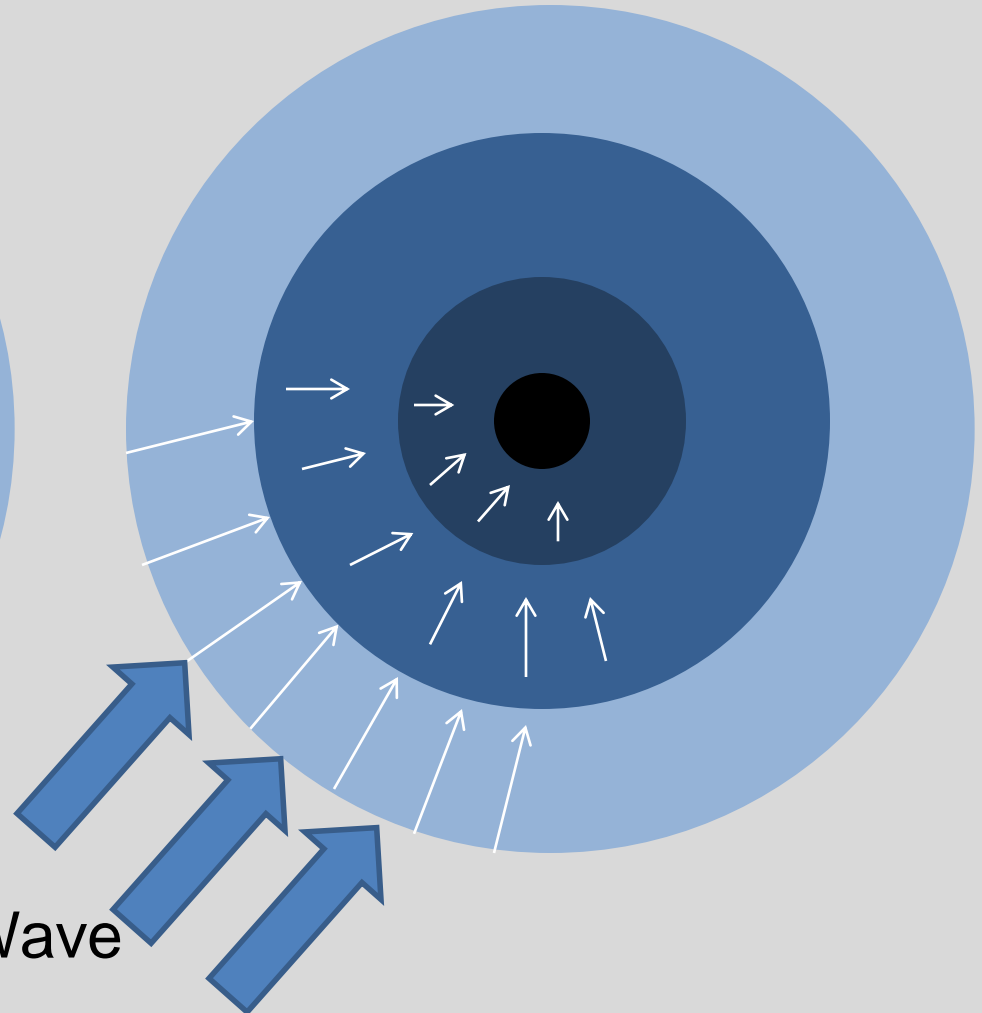


Collapse Theories

Inside - Out



Outside - In



Density Wave