Transition to Coherence: Finding the Edge of Coherent Cores

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Dense Cores

Goodman et al. (1998)
$T_A^{\star}(\text{NH}_3)$

Benson & Myers (1989)

RA (J2000)

Dec (J2000)

NH$_3$ (1,1) integrated intensity (K km s$^{-1}$)

GBT beam 0.1 pc

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Transition to Coherence

\[ \alpha_y \text{ (km s}^{-1}\text{)} \]

\[ T_{\text{peak (K)}} \]

Coherent Core

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Velocity Dispersion Gradient
Summary

• Four large area maps of NH$_3$(1,1) with the GBT
• NH$_3$(1,1) is found at positions without dust continuum emission
• “Transition to Coherence” is observed for the first time
• Transition to Coherence is very sharp: in ~0.06pc the $S_v$ changes by a factor of 2x
• The transition to coherence could provide a robust definition of a dense core
• It might provide stronger constrains on simulations than pointed observations
$\text{NH}_3(1,1)$ and dust emission
Centroid Velocity map

RA (J2000)

Dec (J2000)

$V_{\text{lsr}}$ (km s$^{-1}$)

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Kinetic Temperature map

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Non-Thermal component

\[ \frac{\sigma_{NT}}{\text{km s}^{-1}} \]

\[ \text{NT} = 0.5 \]

\[ \sigma_{NT} = \sigma_T \]

\[ \sigma_{NT} = 0.5 \sigma_T \]

\[ T_{\text{peak}} \text{(K)} \]

\[ \sigma_{\text{Thermal of } H_2} \text{(km s}^{-1} \)