

OBSERVING WITH HERA

The Elephant Trunks



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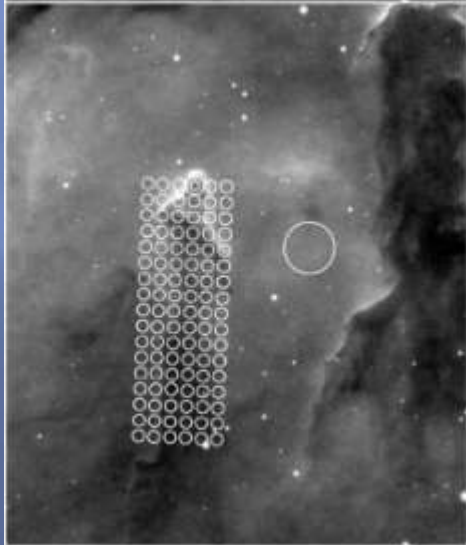
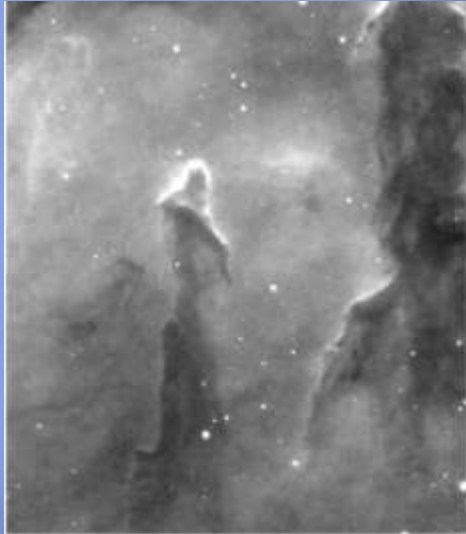
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Pierre Hily-Blant

What we will speak about...

1. Introduction
2. Observing NGC 7822
3. Reduction protocol
4. Preliminary results
5. Summary & Conclusions

Introduction



NGC 7822 (S171, W1)

$^{12}\text{CO}(1-0)$ & $^{13}\text{CO}(1-0)$ at 3mm

20m Telescope
Onsala Space Observatory

HPBW $\sim 33''$
Frequency-switching mode
1600 channels, bandwidth 40MHz
 $\Delta v = 0.07$ km/s

Gahm et al. 2006 A&A, 454, 201

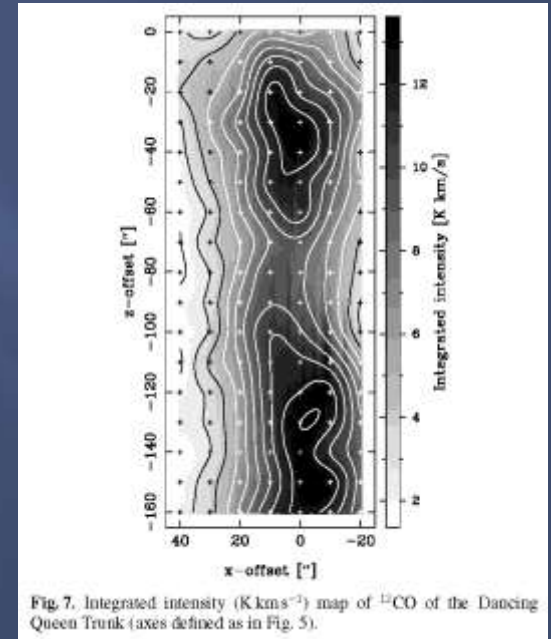


Fig. 7. Integrated intensity (K km s^{-2}) map of ^{12}CO of the Dancing Queen Trunk (axes defined as in Fig. 5).

Observing NGC 7822

$^{12}\text{CO}(2-1)$ at 1 mm with HERA (IRAM 30m)

Field size: 5' X 6'

HPBW = 11"

Frequency-switching mode

Spatial sampling: 4"

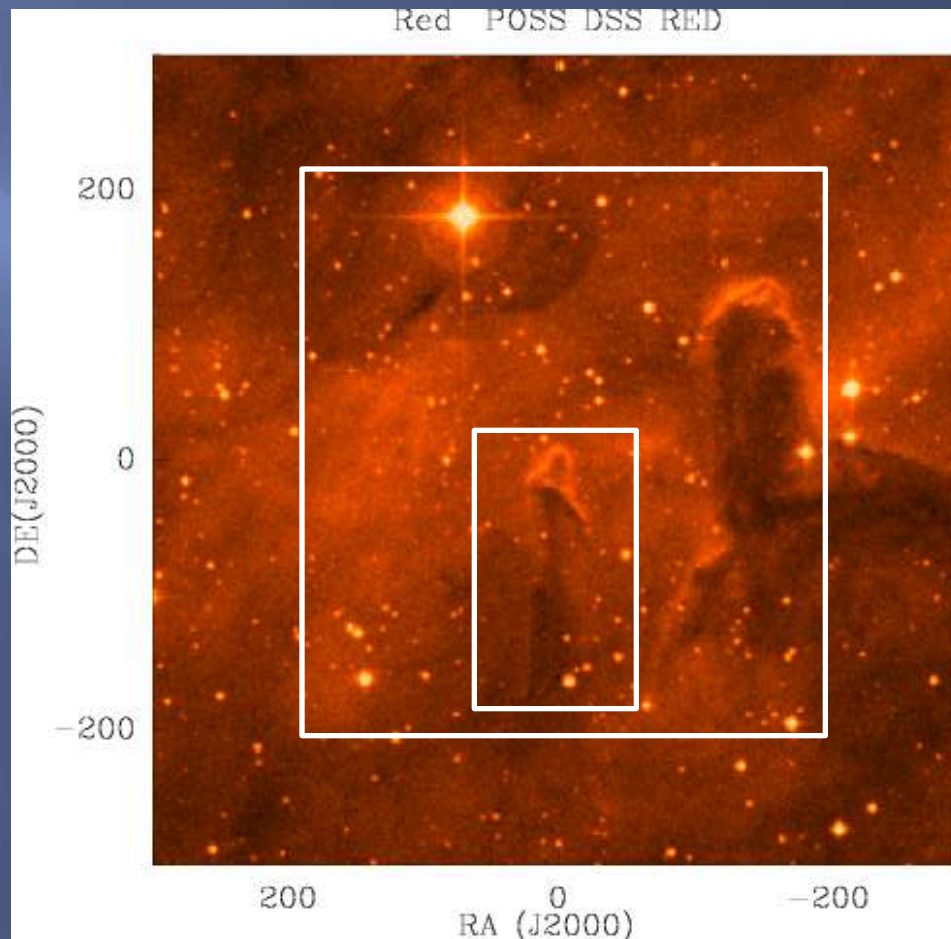
Scan speed: 4"/s

Spectral resolution: $\delta\nu=40$ kHz

Expected temperature: $T > 3.5$ K

On-source time: 1 hour

rms noise level: ~ 0.6 K



Observing with HERA – The Elephant Trunks

Observing

$^{12}\text{CO}(2-1)$ at 1 mm with HERA (IRAM)

Field size: 5' X 6'

HPBW = 11"

Frequency-switching mode

Spatial sampling: 4"

Scan speed: 4"/s

Spectral resolution: $\delta\nu=40$ kHz

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Reduction protocol

Check the data (quality, spikes, ghost lines...)

Fit & subtract a baseline (Nth degree)

Fold the spectra

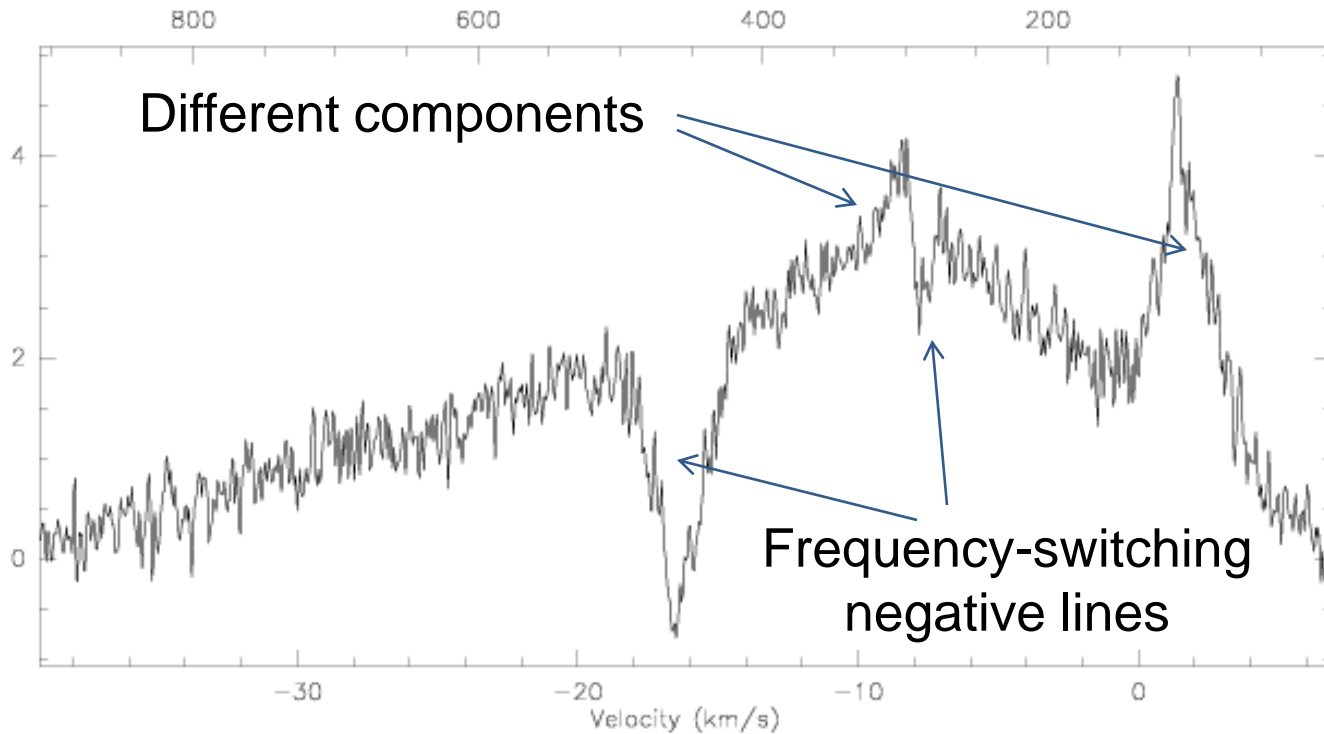
Check the baseline quality

Make the cube

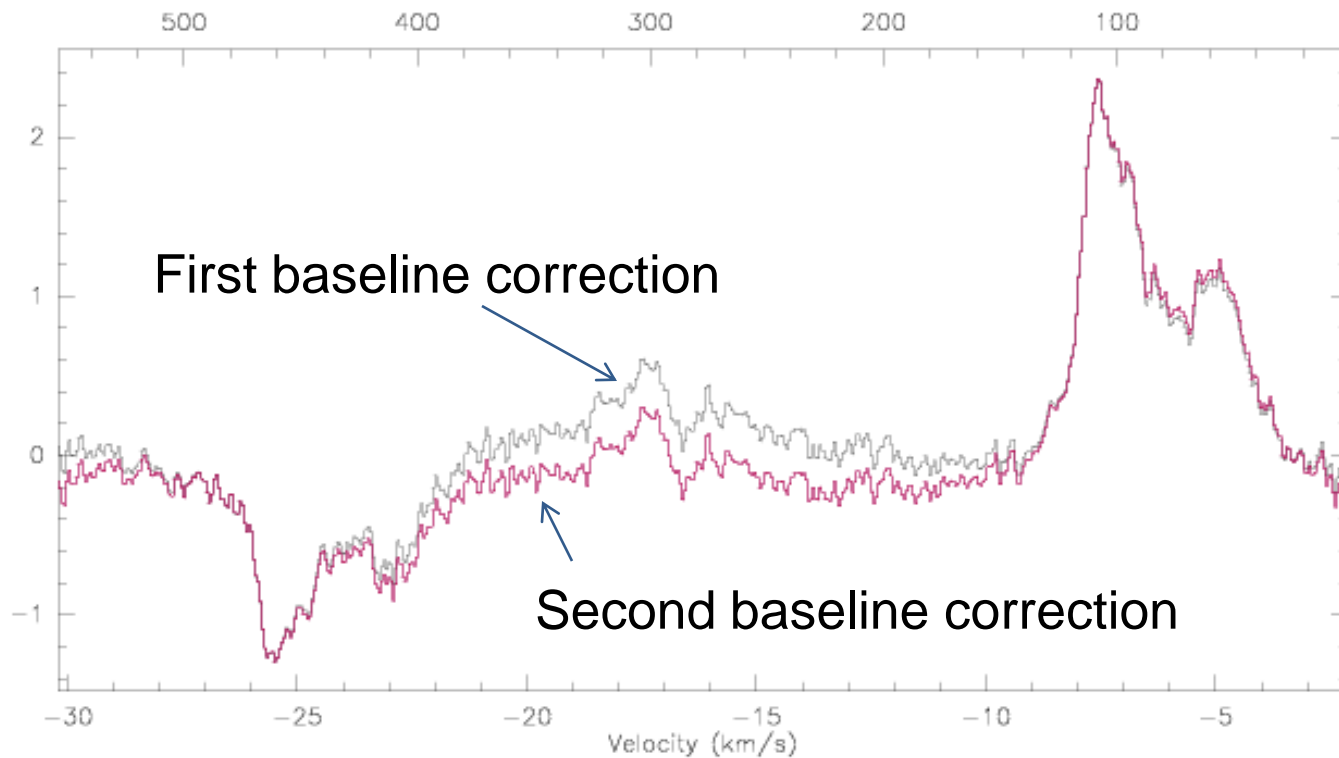
Start data analysis



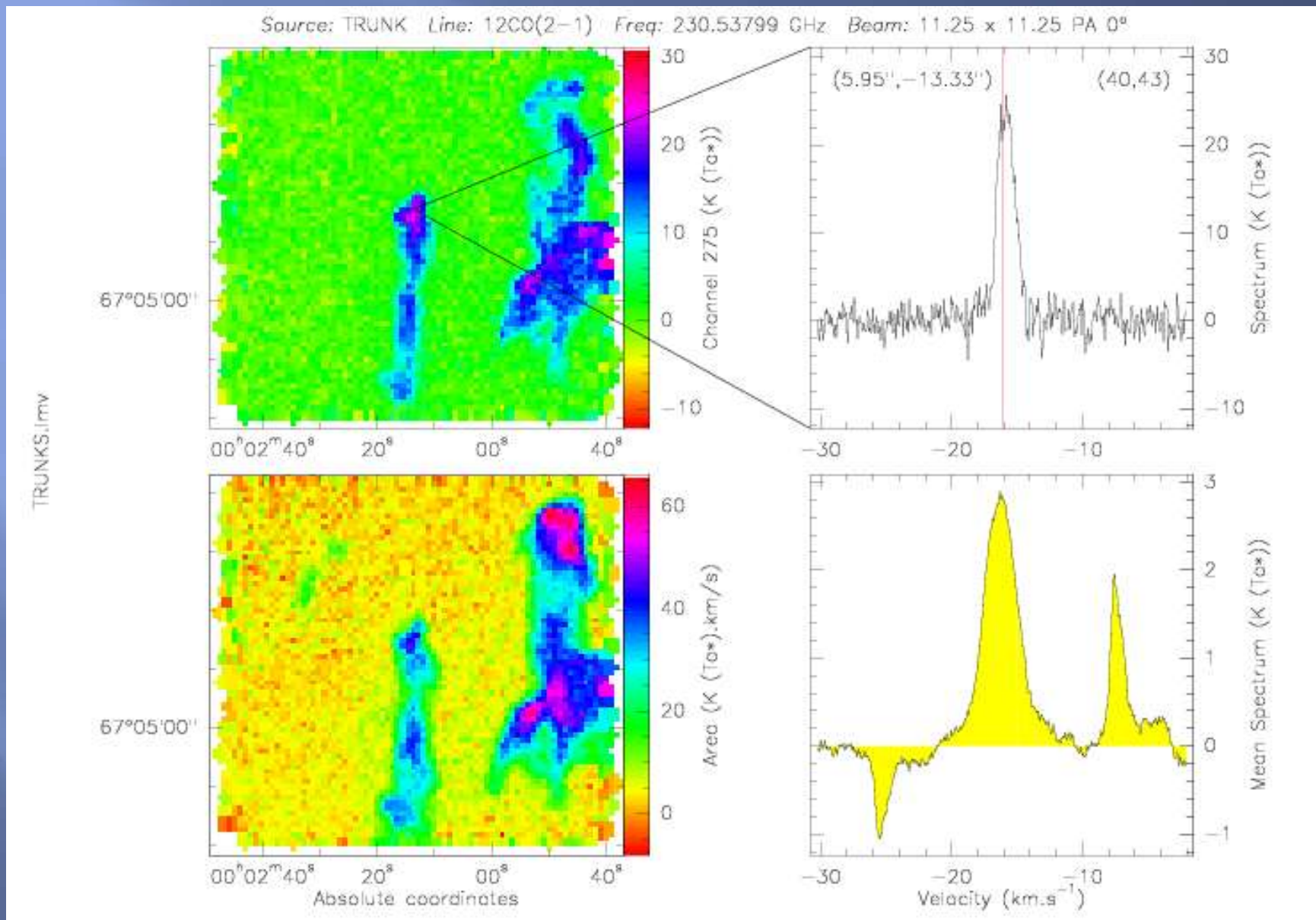
RAW SPECTRUM



BASELINE-CORRECTED SPECTRUM



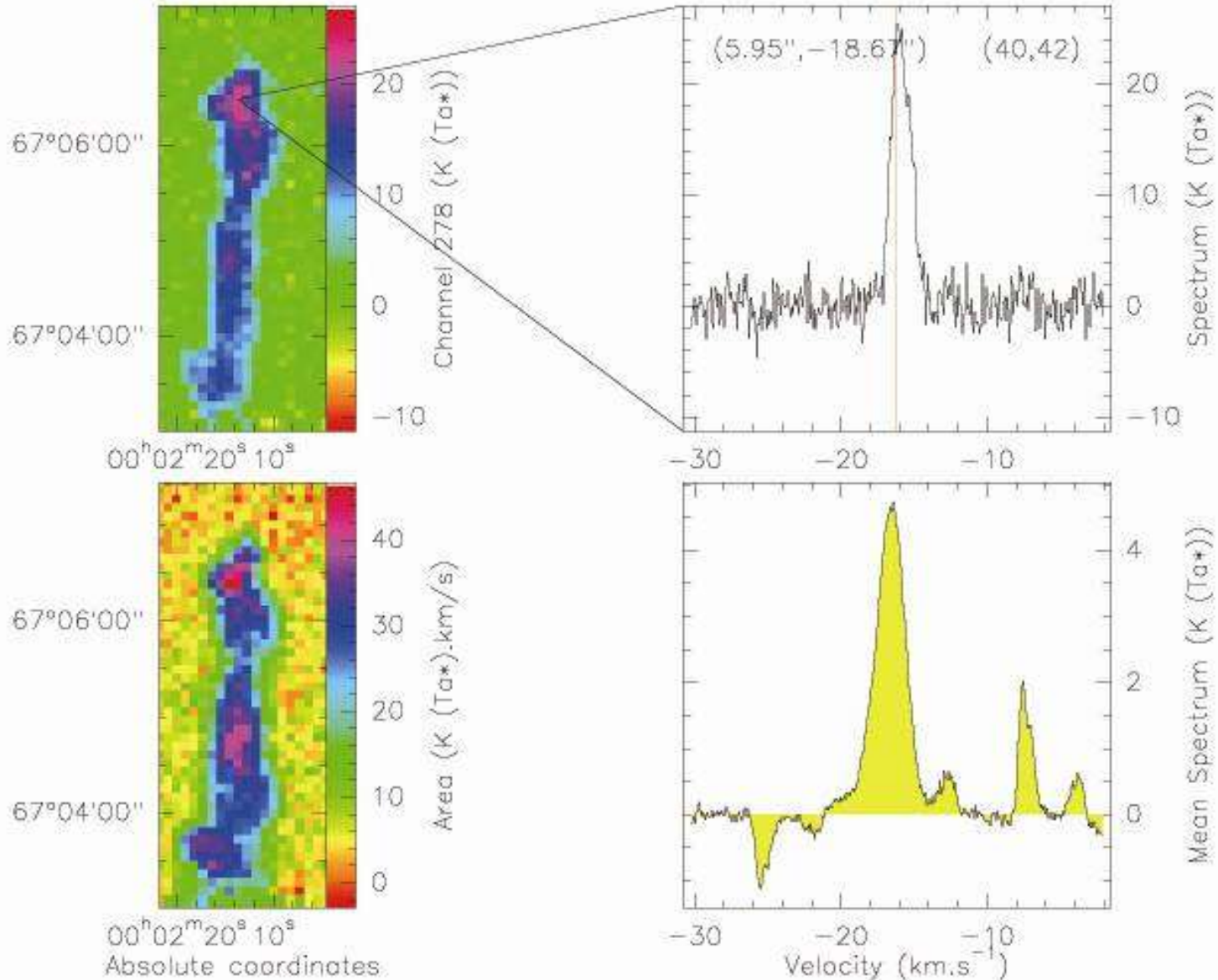
Observing with HERA – The Elephant Trunks



Observing with HERA - The Elephant Trunks

Source: TRUNK Line: 12CO(2-1) Freq: 230.53799 GHz Beam: 11.25 x 11.25 PA 0°

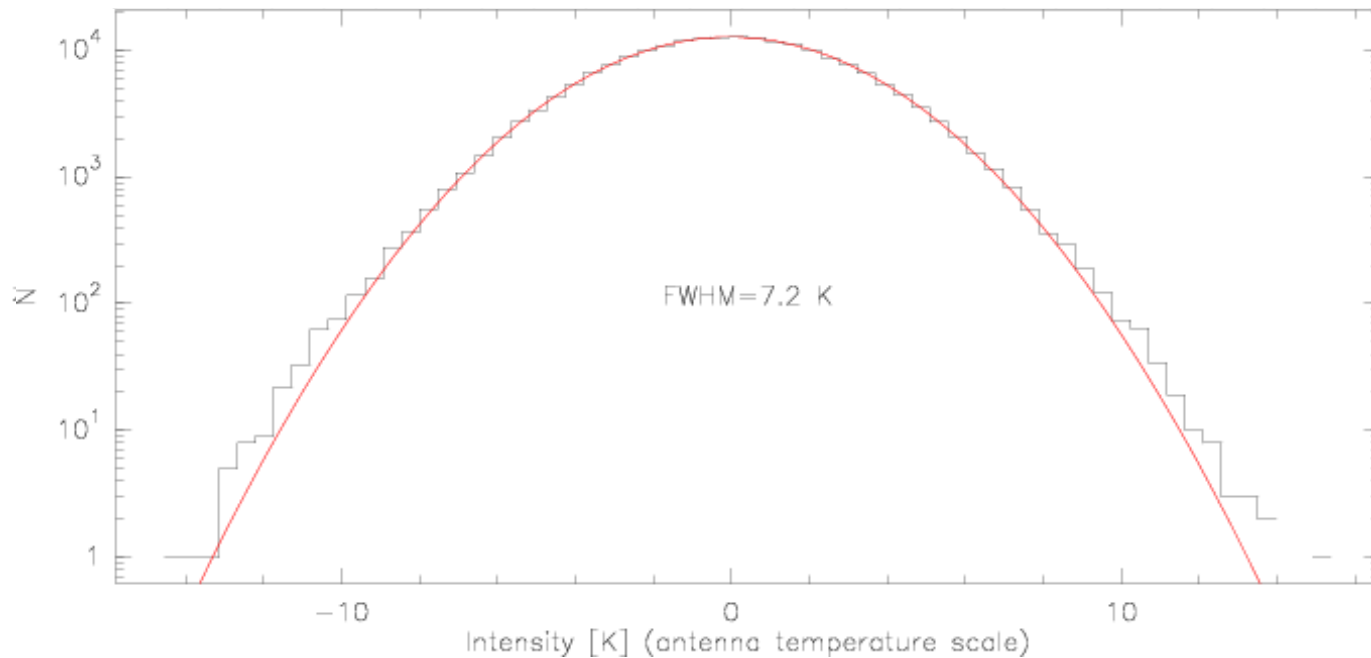
final.lm7



Reduction protocol

WHITE NOISE ? ... YES!!

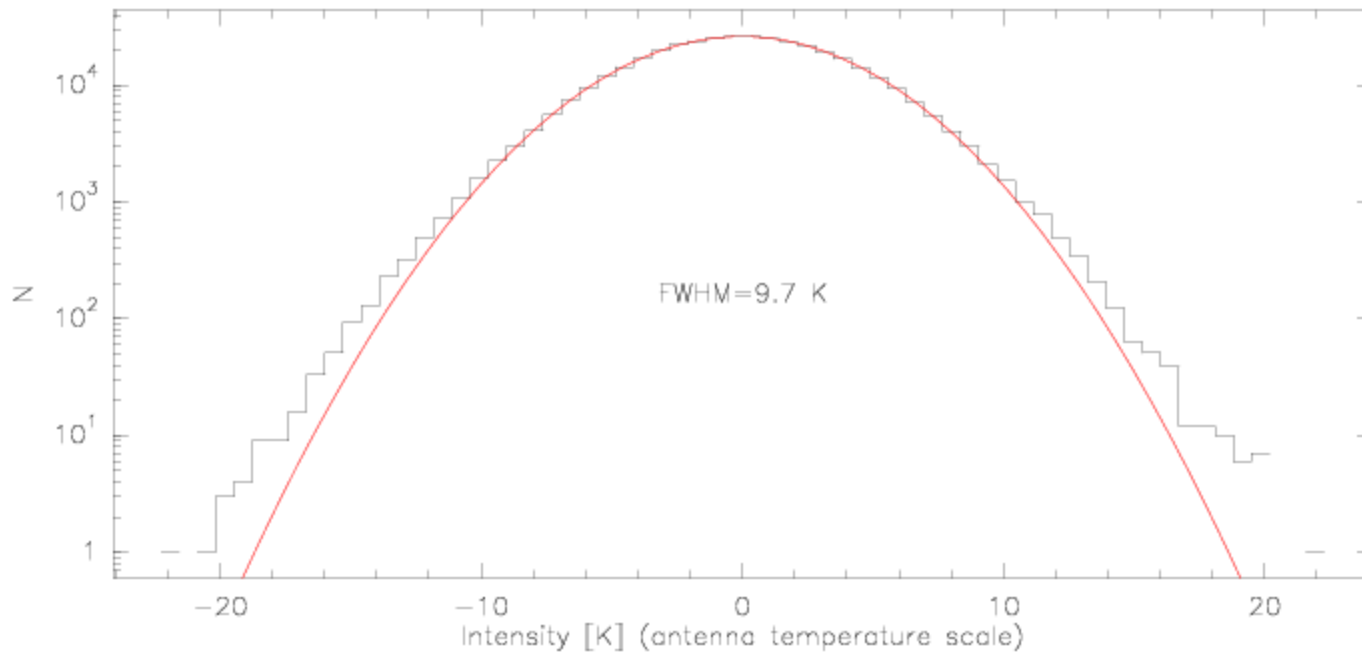
rms noise level ~ **3 K** (1σ) for **HERA 1**



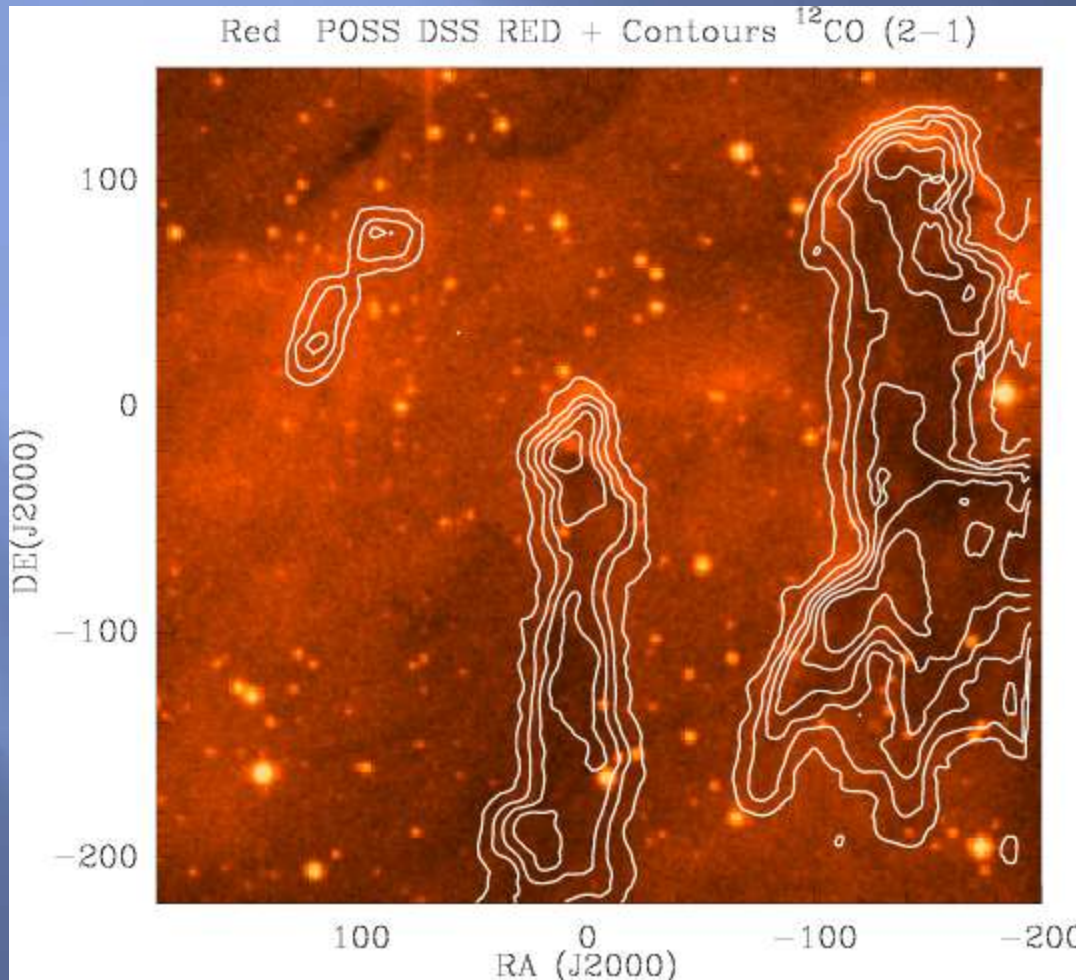
Reduction protocol

WHITE NOISE ? ... YES!!

rms noise level ~ **4 K** (1σ) for **HERA 2**



Preliminary results



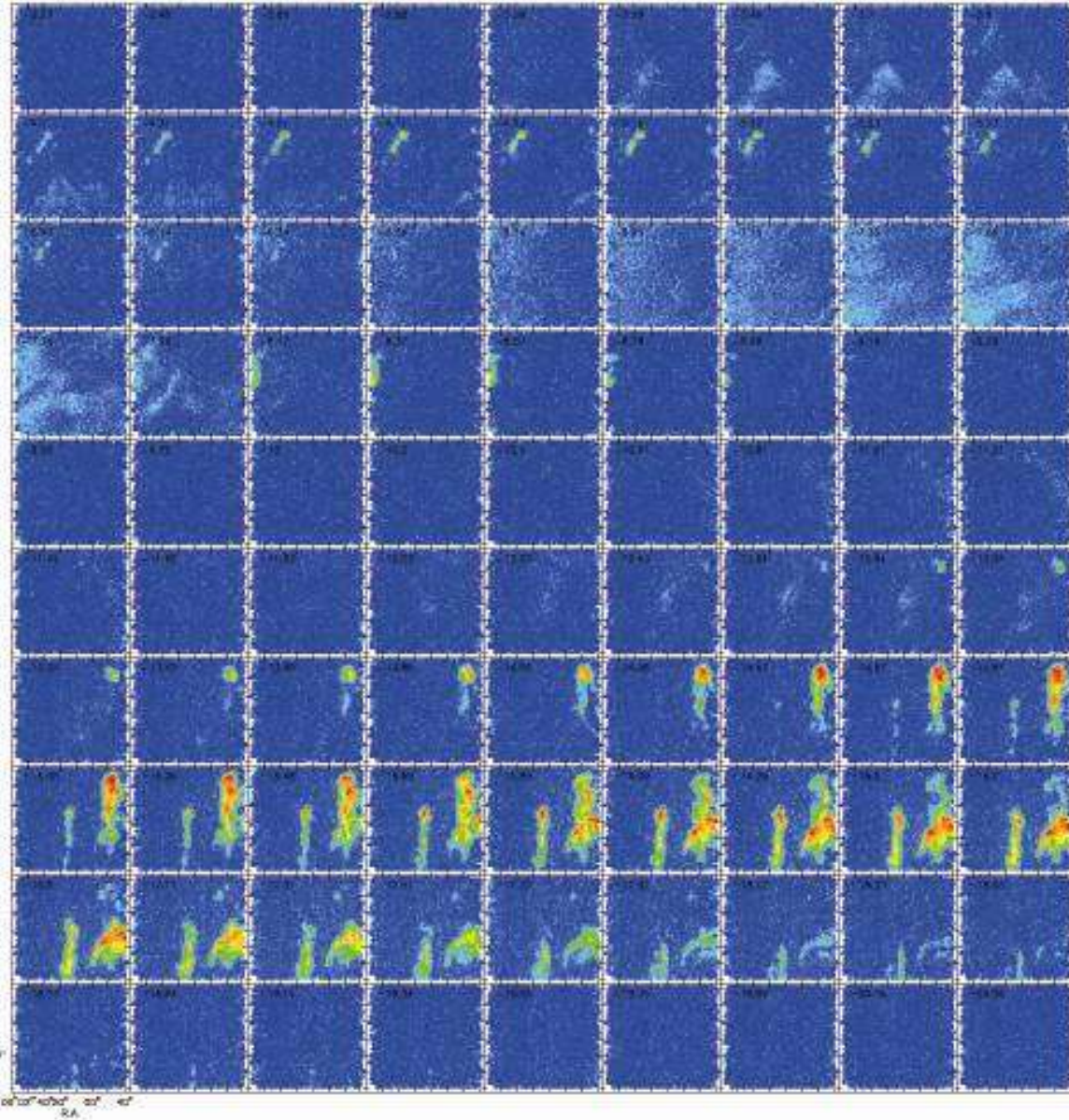
Colour scale:

POSS blue

White contours:

$^{12}\text{CO}(2-1)$ integrated emission

CHANNEL MAPS

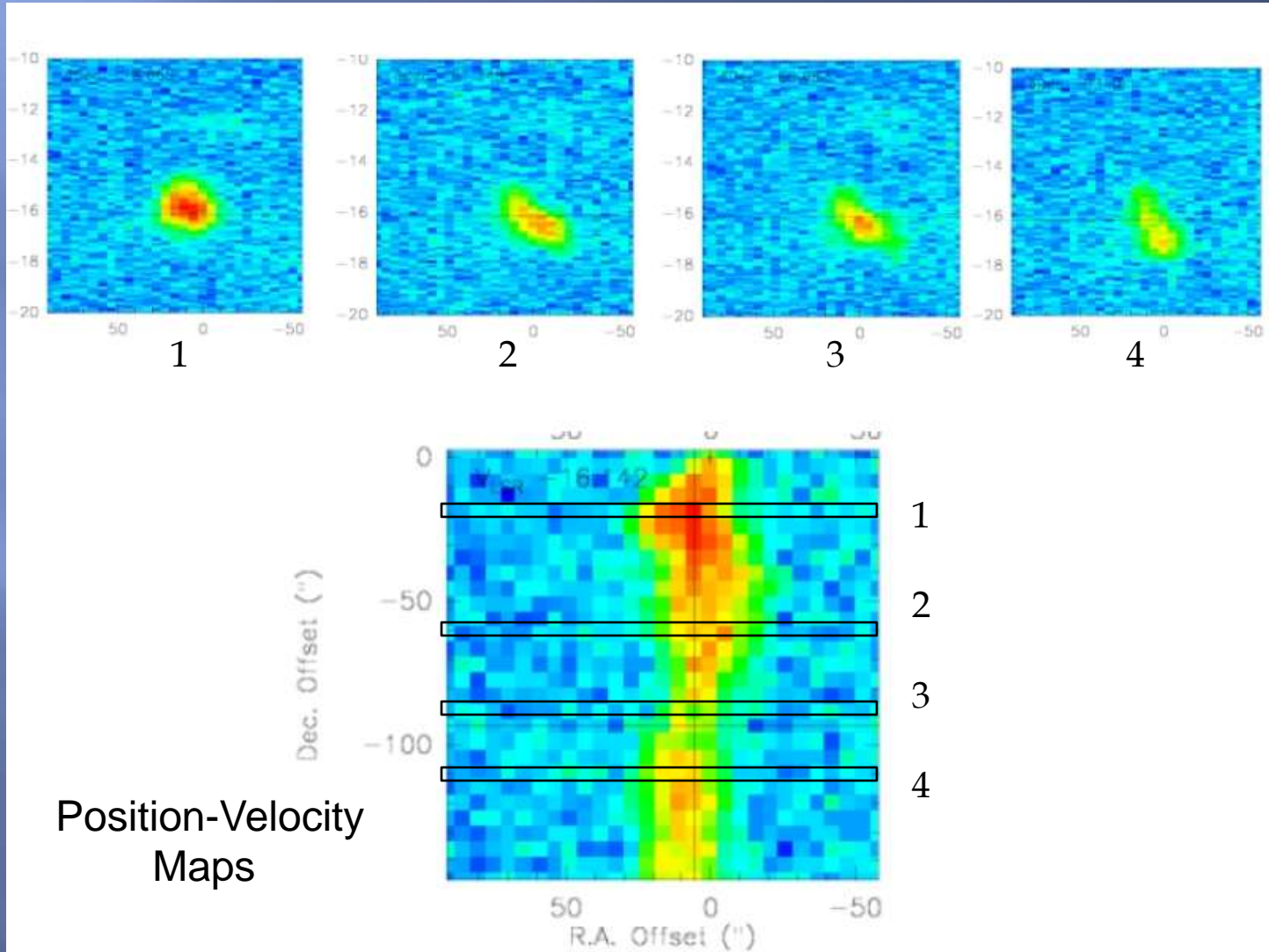


New component
(Cores?)

Diffuse component

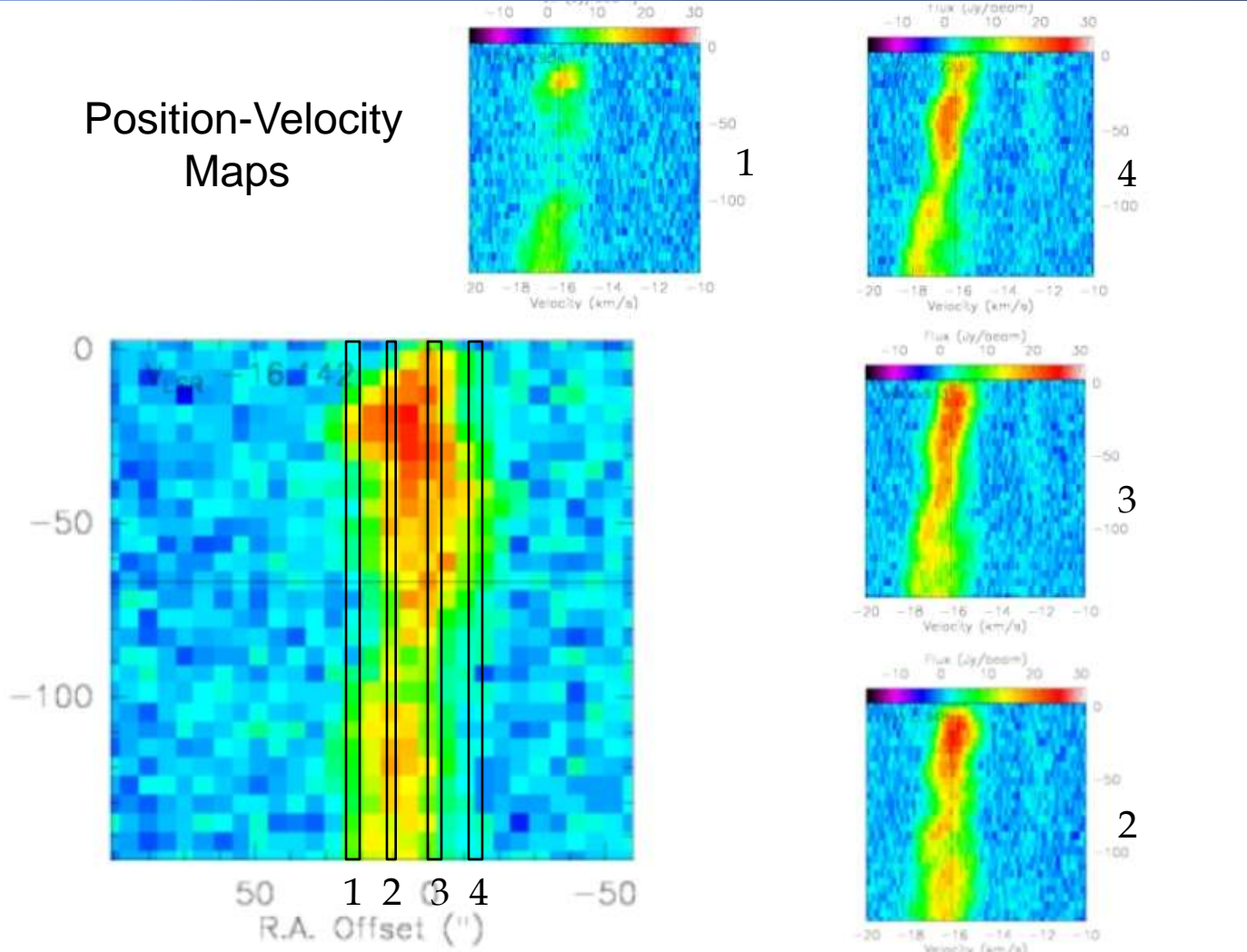
Both Trunks

Preliminary results



Preliminary results

Position-Velocity
Maps



Summary

- $^{12}\text{CO}(2-1)$ observations with HERA (IRAM 30m) towards NGC 7822
factor of 3 better resolution, factor of 10 larger map
- We have used CLASS90 to reduce and analyse
- Detection of
 - two « elephant trunks »
 - core-like structure detection
 - diffuse component
- Signatures of complex rotation in both trunks

More results will be presented in a paper (check astro-ph/071021)



Thanks for your Attention