

“Real“ Filaments and B-fields in 3D

“Among the most surprising things in connection with these dense cores are the filaments that so frequently run from them for great distances. These filaments undoubtedly have had something to do with the formation of the dense cores.”

“Real“ Filaments and B-fields in 3D

ON A NEBULOUS GROUNDWORK IN THE CONSTELLATION *TAURUS*

By E. E. BARNARD

1907

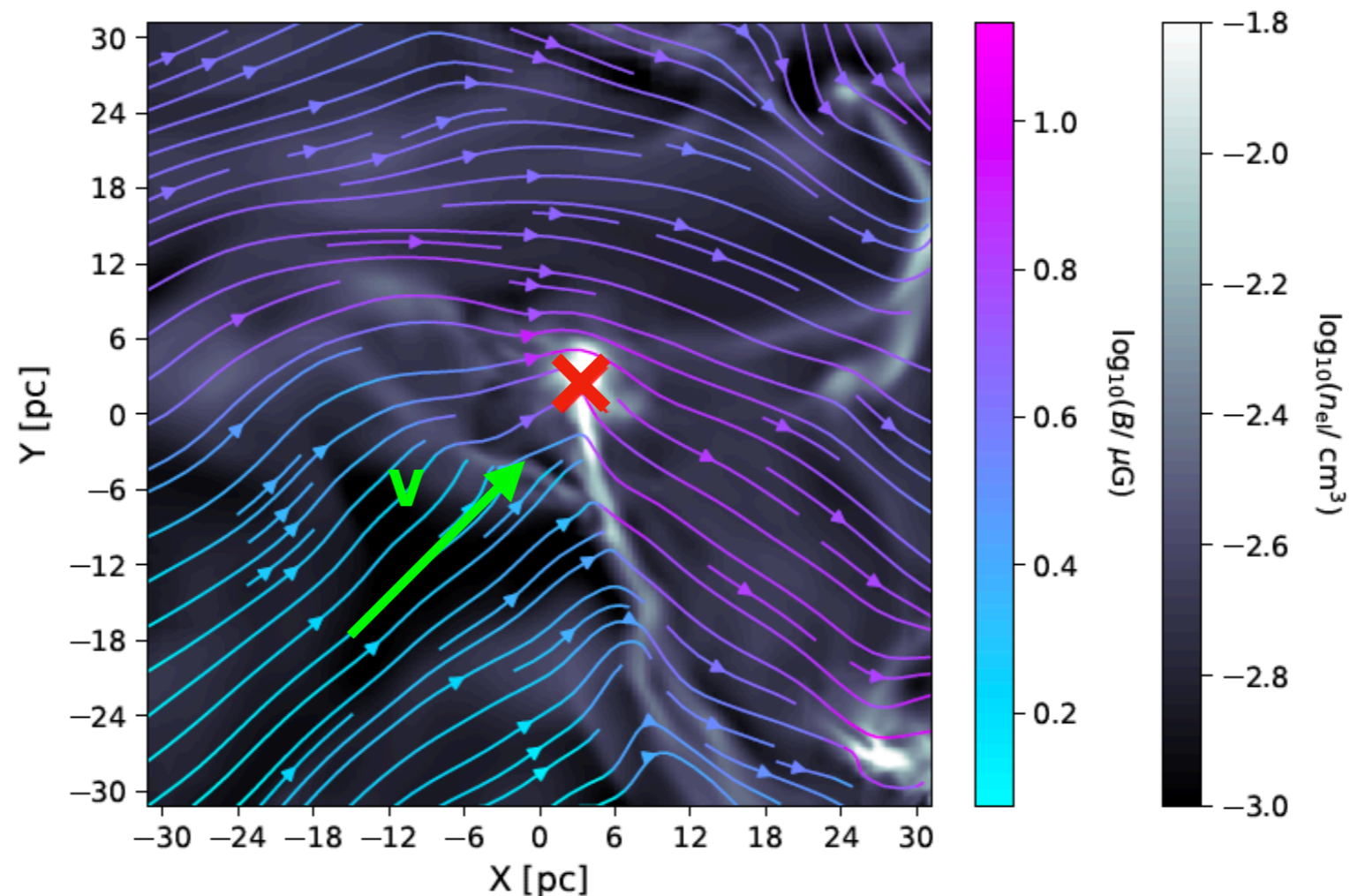
“Among the most surprising things in connection with these nebula-filled holes are the vacant lanes that so frequently run from them for great distances. These lanes undoubtedly have had something to do with the formation of the holes and with the nebula in them.”

dark lanes <-> filaments

nebula+holes <-> dense cores

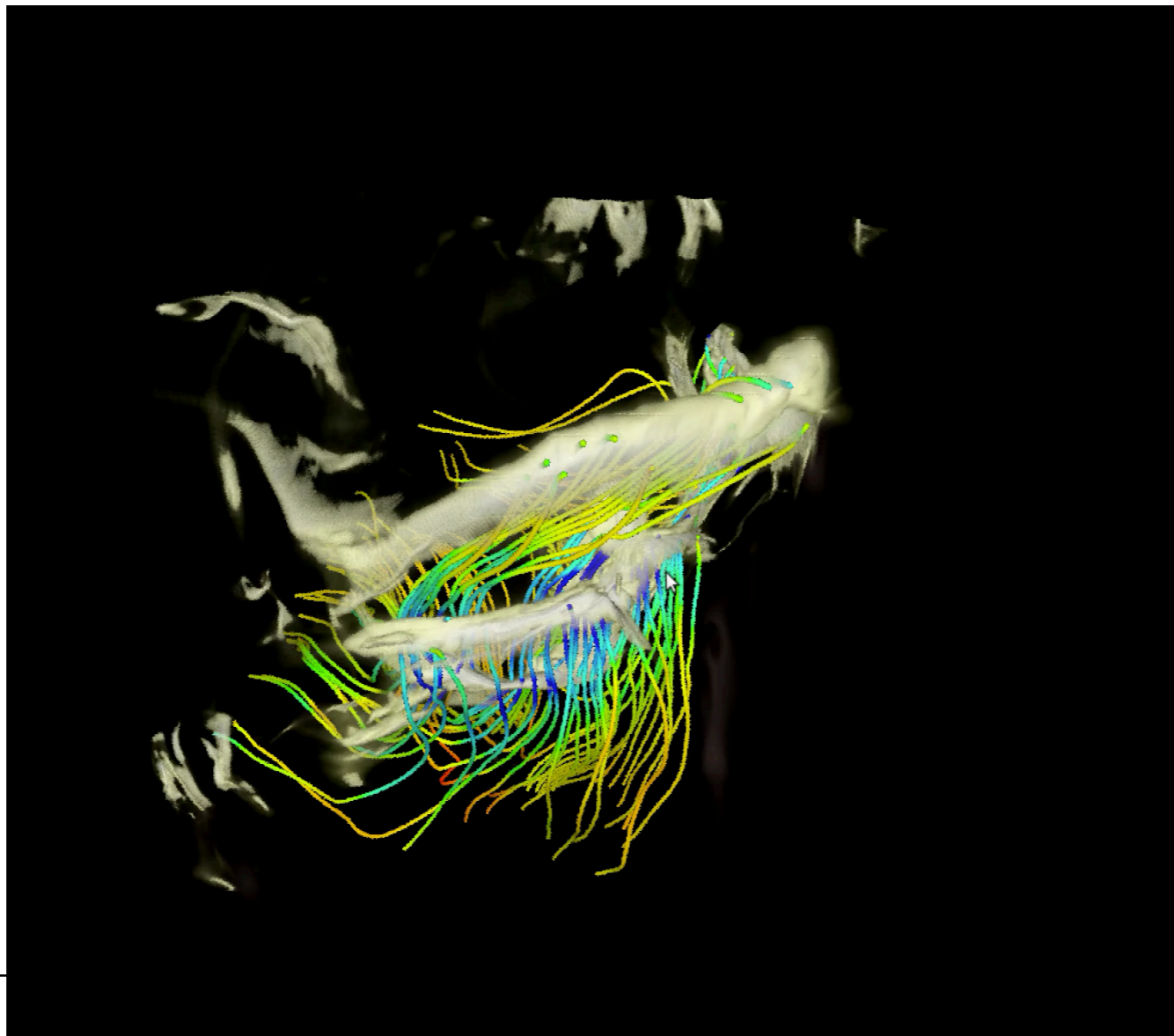
“Real” Filaments and B-fields in 3D

- Filament modelled in SILCC-Zoom
- Magnetic field shows kink at filament position
 - -> dragged along with filament
 - -> attached to sheet



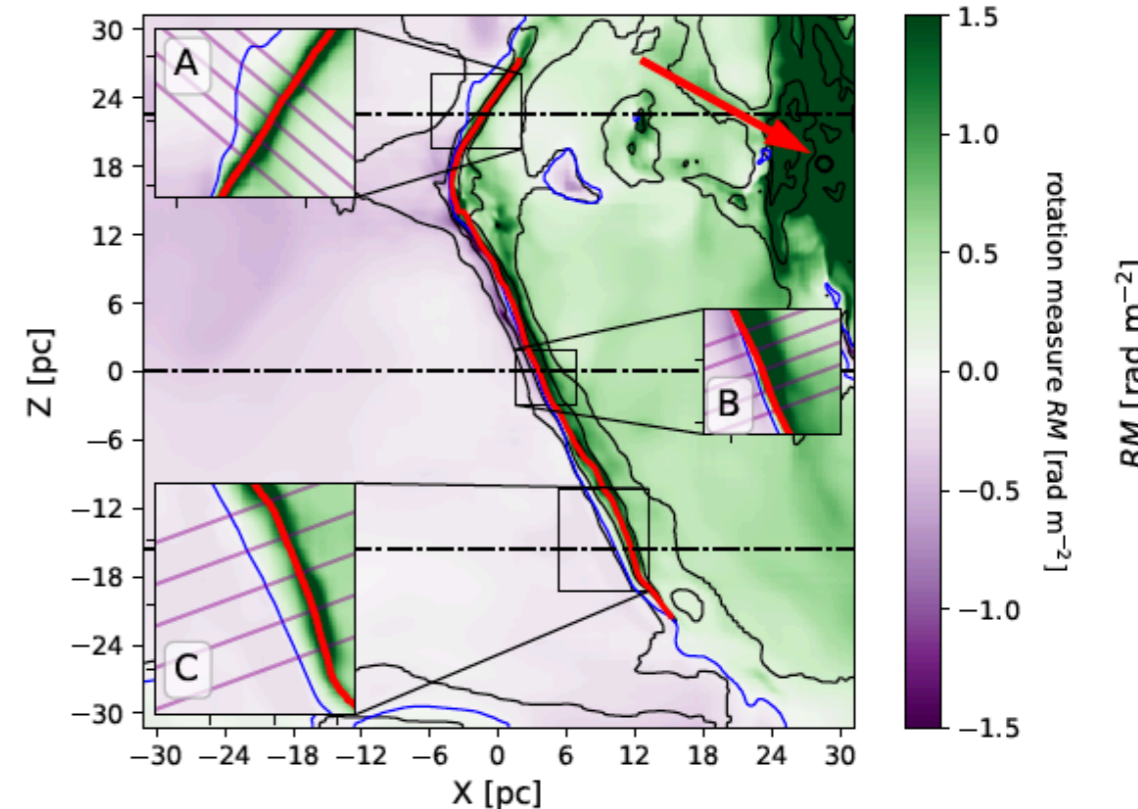
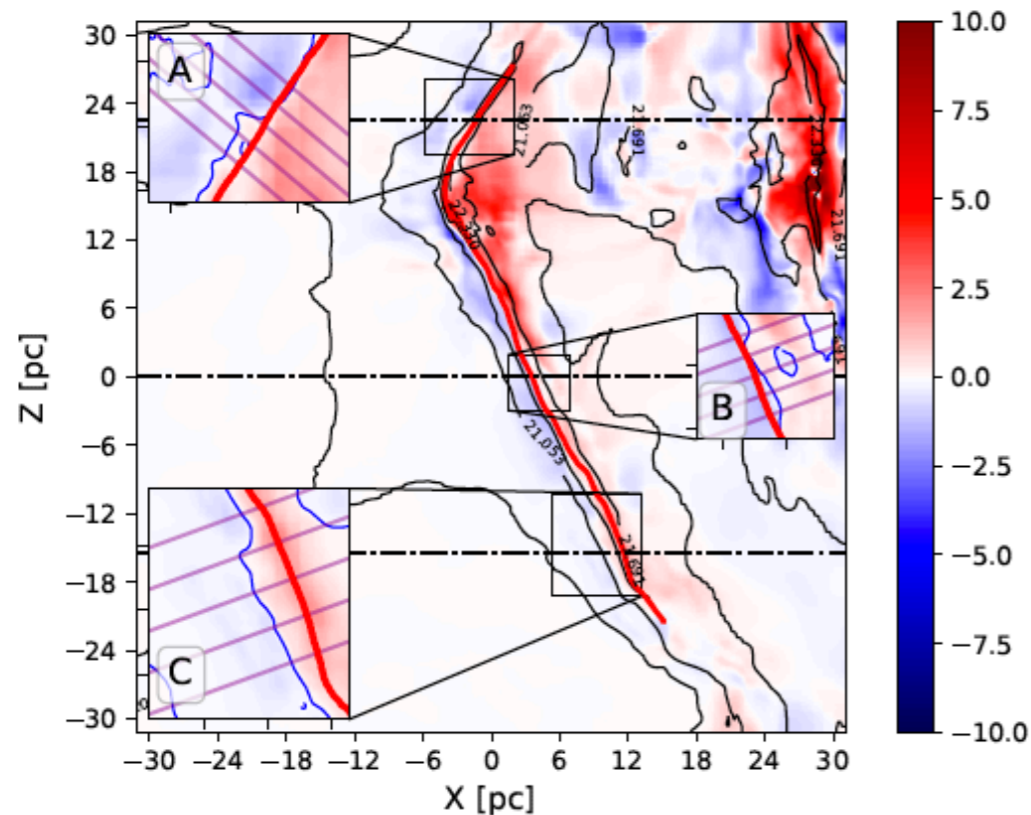
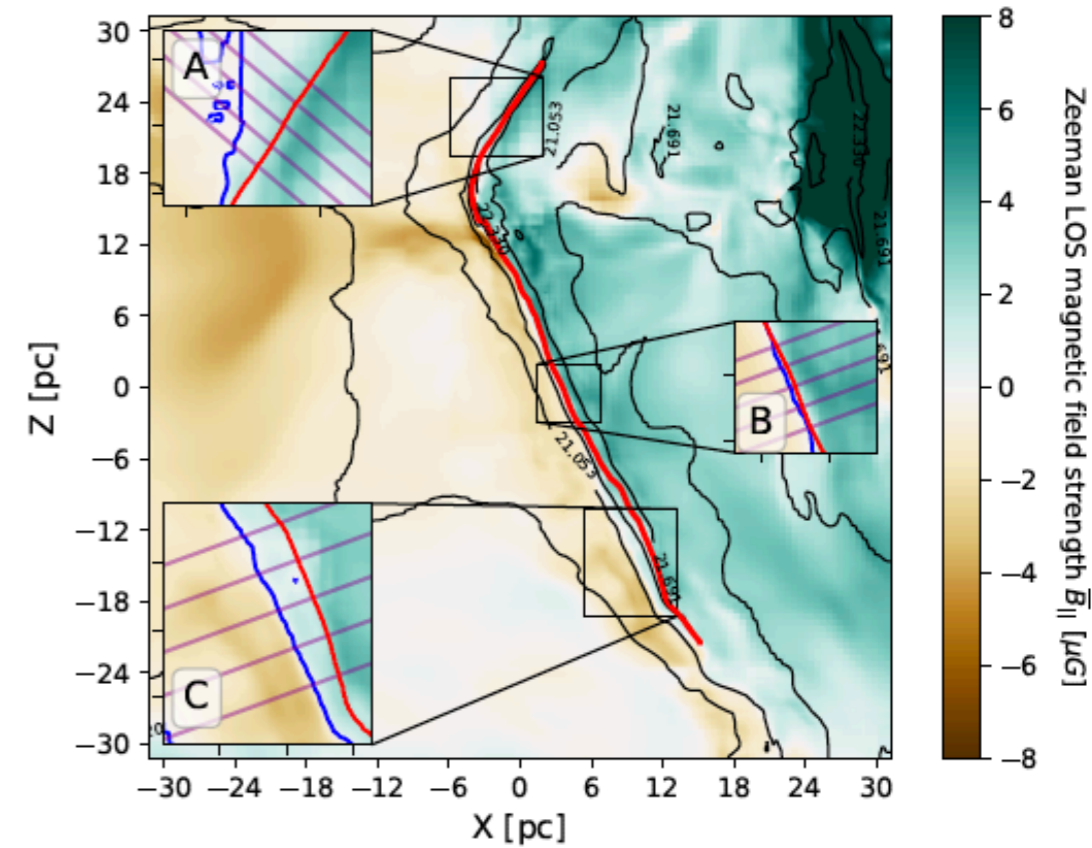
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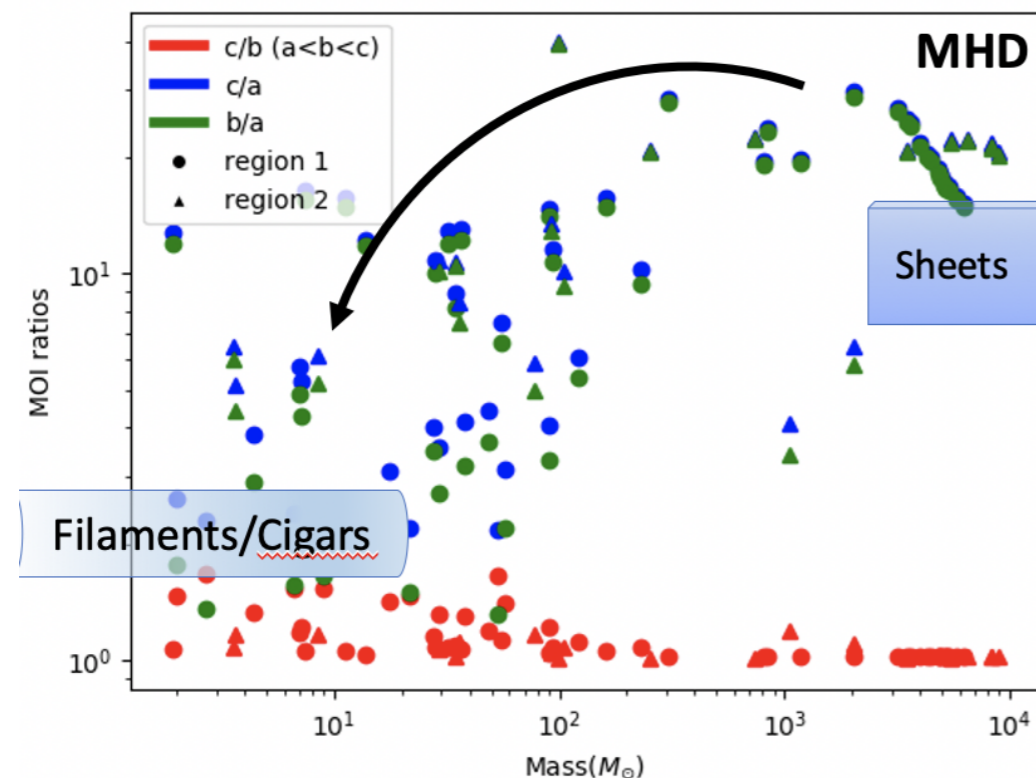
“Real” Filaments and B-fields in 3D

- Can we determine field structure?
- Kink of field visible in
 - HI circular polarisation
 - Zeeman splitting
 - Faraday RM

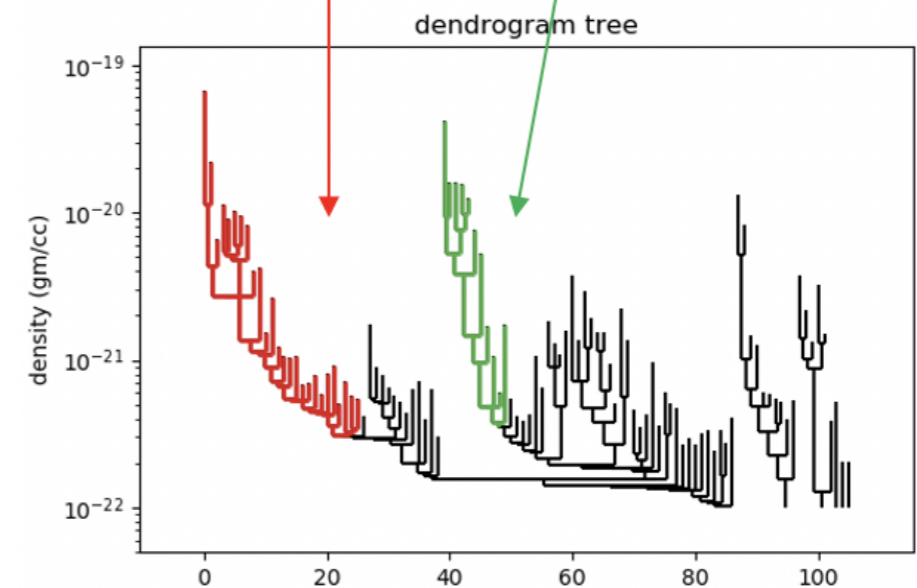
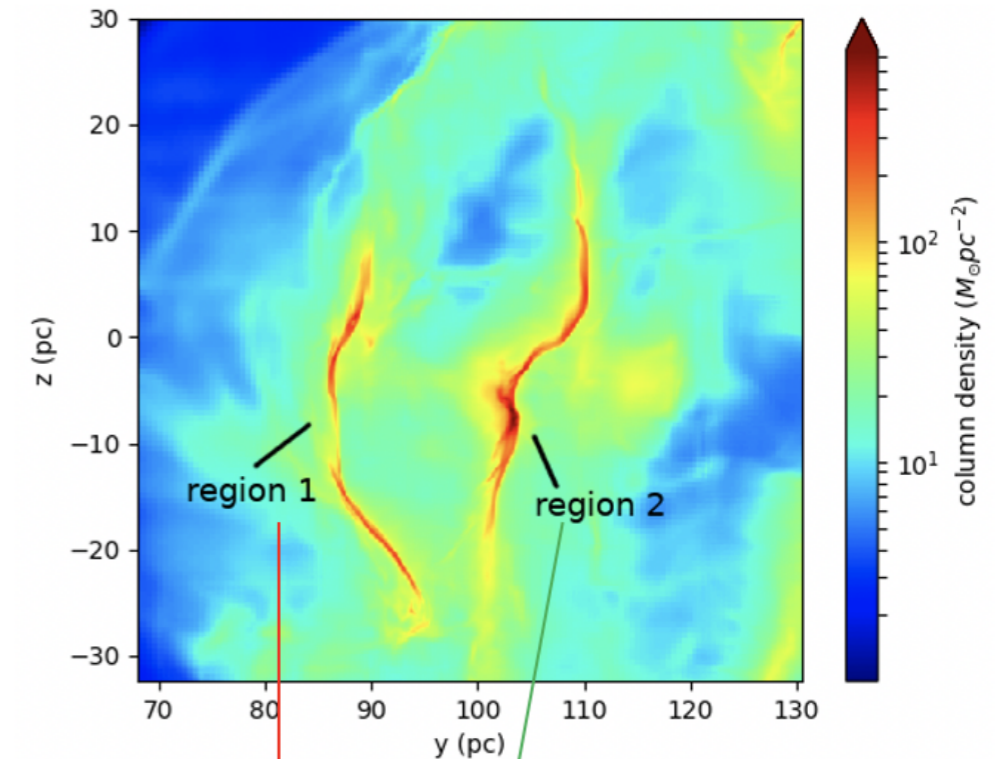


“Real” Filaments and B-fields in 3D

- Dendrogram analysis in 3D:
 - For all cells belonging to one branch
- Calculate their inertia tensor, eigenvector and eigenvalues
 - Sort eigenvalues ($a < b < c$)



Ganguly, SW, DS, in prep.



Rosolowsky+2008

AstroDendro: Robitaille+2019