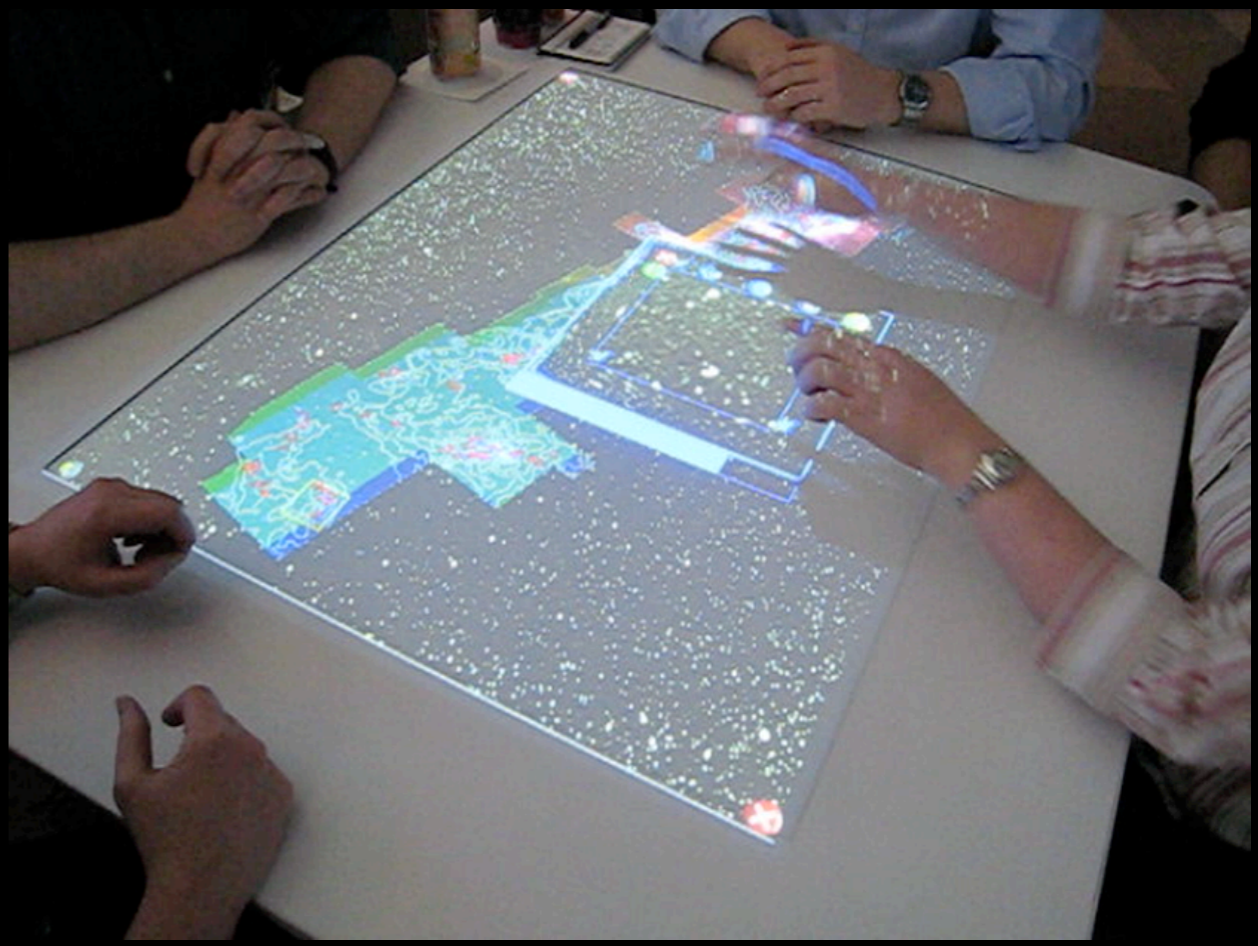
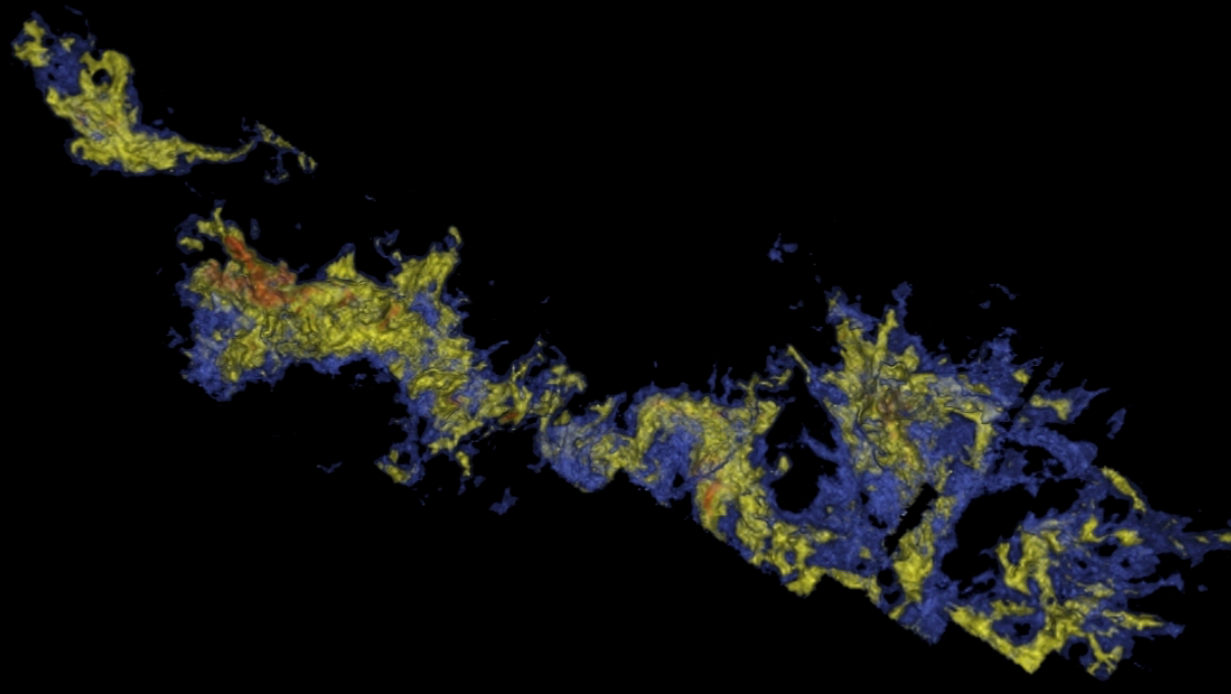
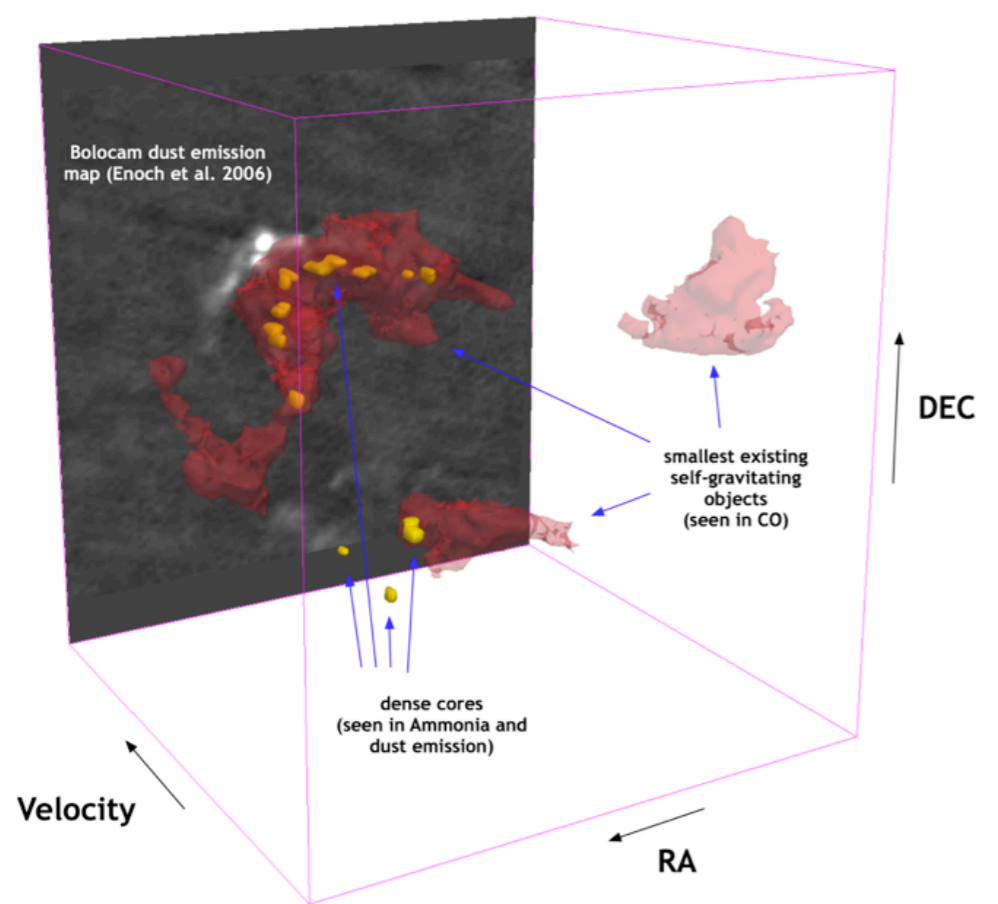


Seeing



Science



Seeing Science: Today

Seeing Science: Today

Session Introduction: Data & Dimensions (**Goodman**)

Seeing Science: Today

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PART I: HISTORY & OVERVIEW OF SCIENTIFIC VISUALIZATION

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Session Wrap-Up (**Goodman**)

Seeing Science: Today

Full Bios are on the **handouts**
& **online** through **iic.harvard.edu**

Seeing Science: Introduction

Data & Dimensions

Alyssa A. Goodman



Initiative in Innovative Computing @ Harvard
and



Harvard-Smithsonian Center for Astrophysics

1 quantity | on 0 dimensions

Medicine:
My Pulse (bpm)

72

Genomics:
Number of
Nucleotides

4

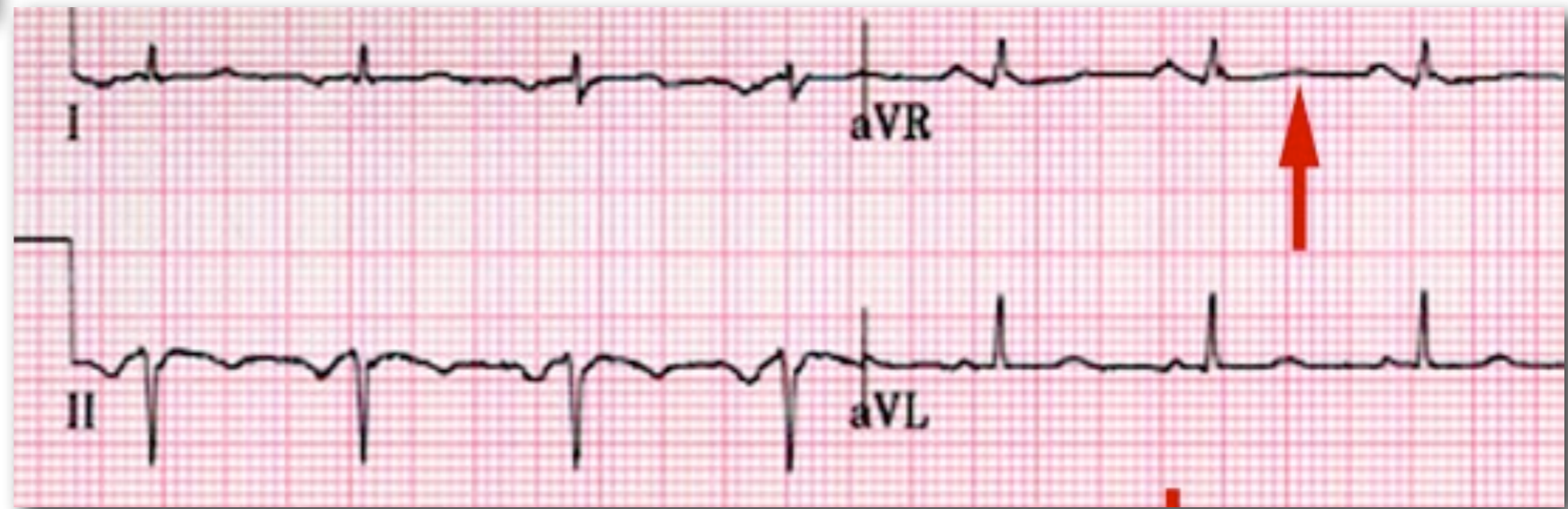
Astronomy:
Speed of Light
(mps)

186,283

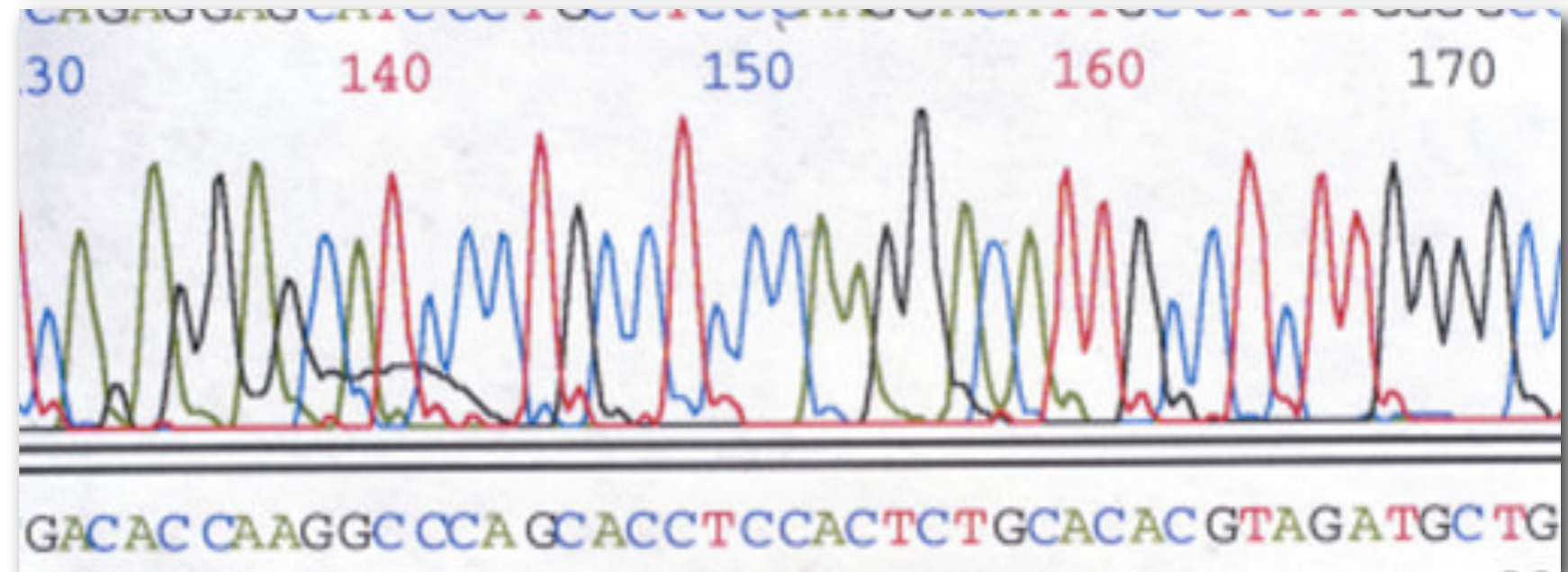
I quantity

on I dimension

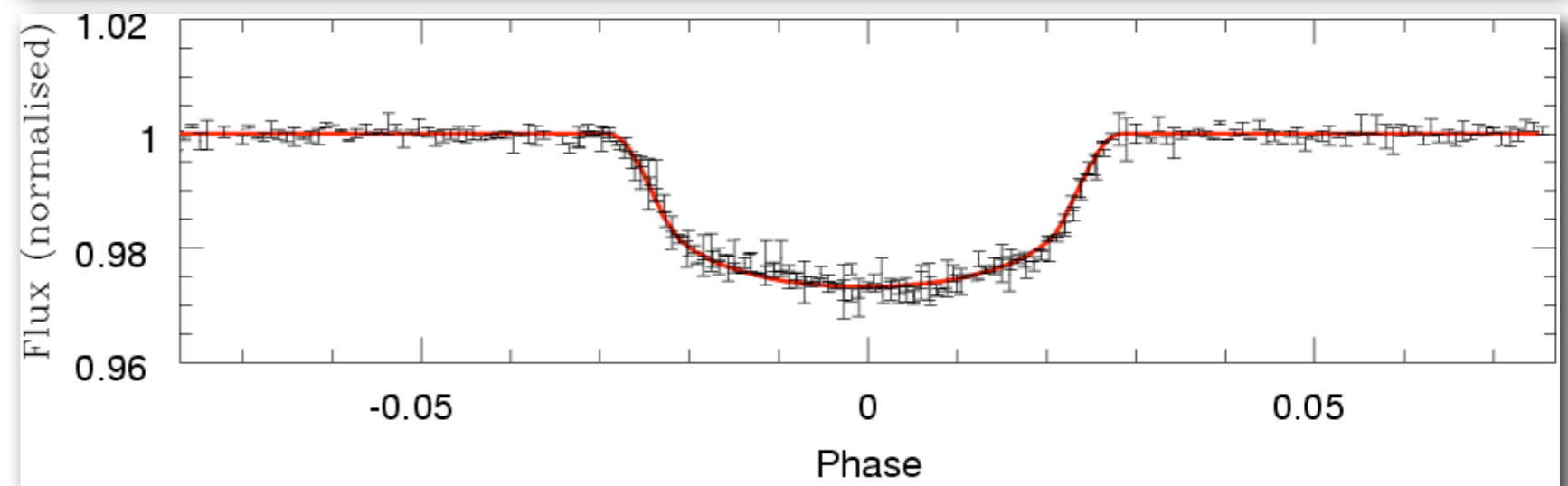
Medicine:
Heart Rhythms



Genomics:
DNA Sequence

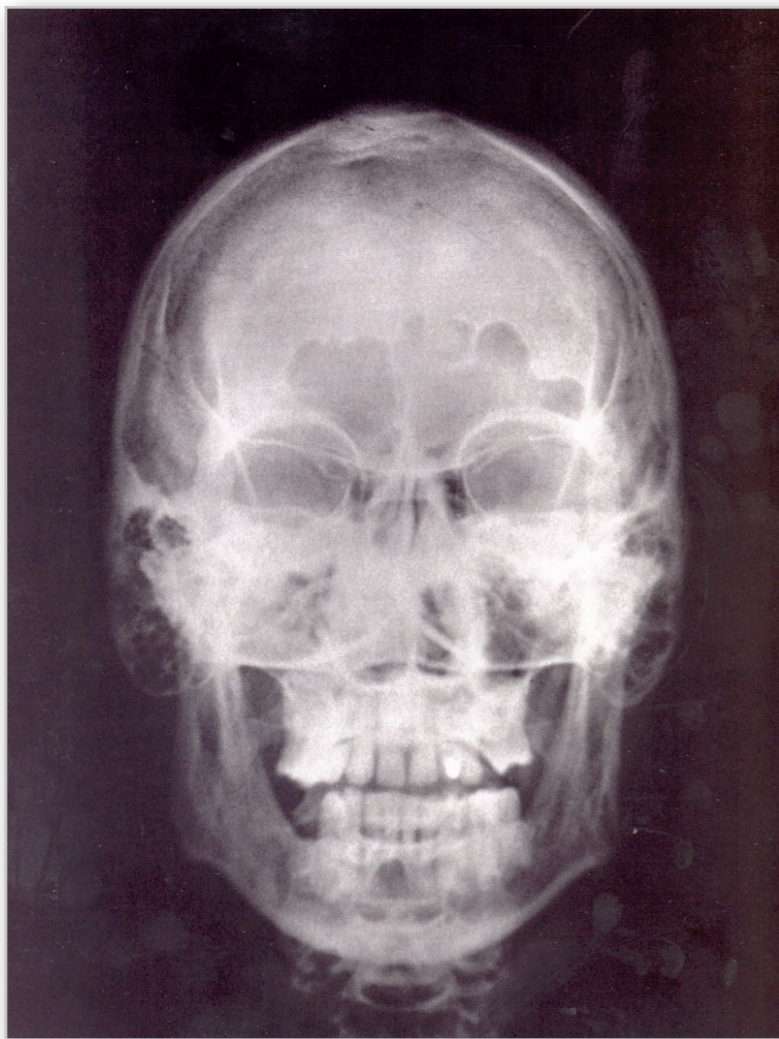


Astronomy:
Planet Transit

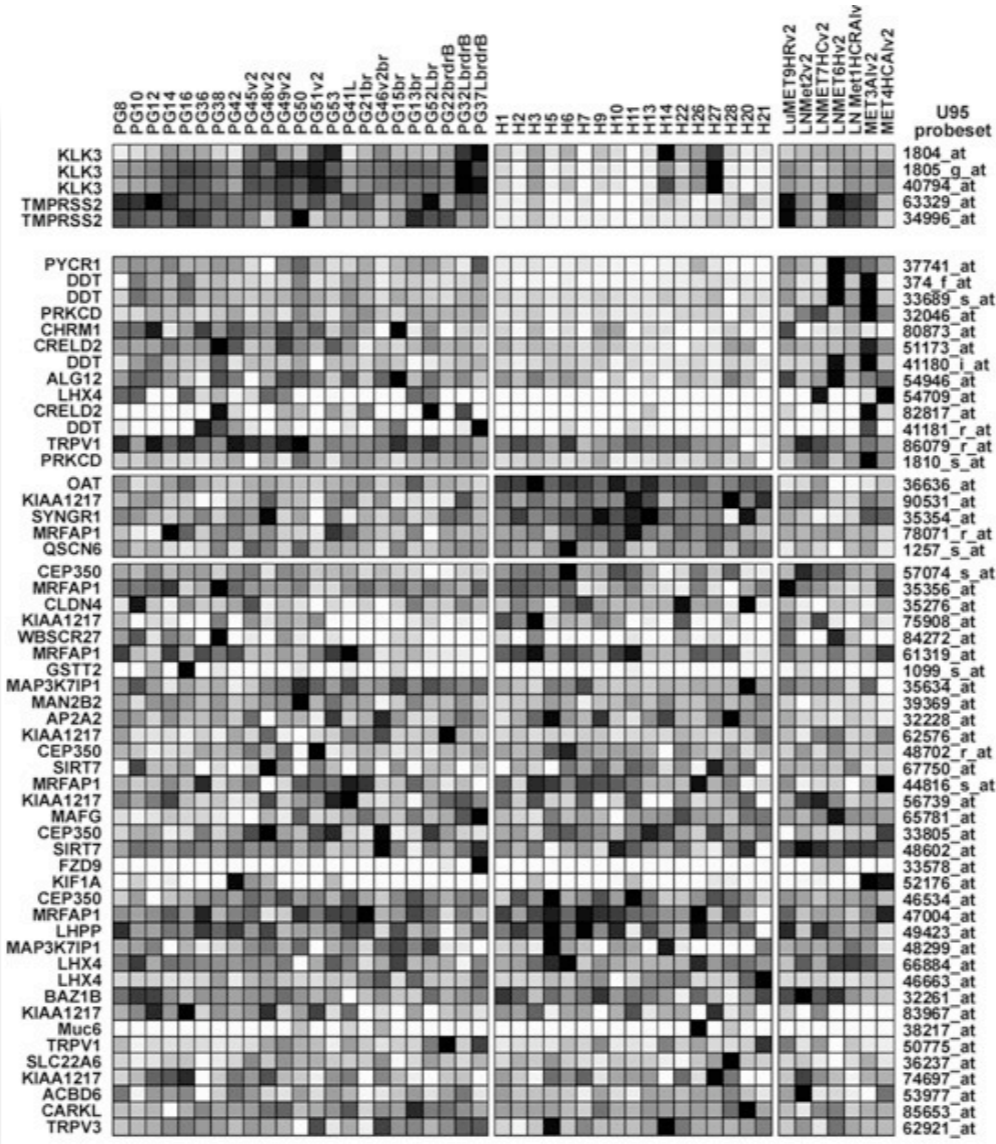


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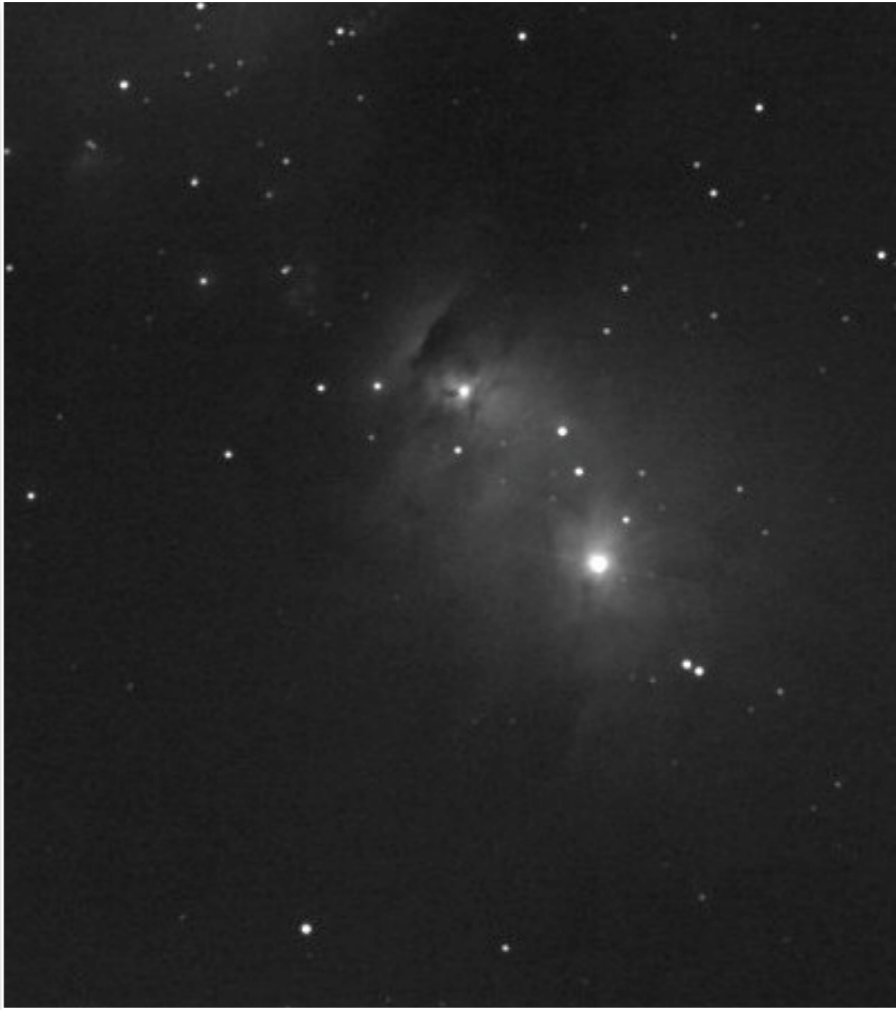
on 2 dimensions



Medicine:
X-Ray



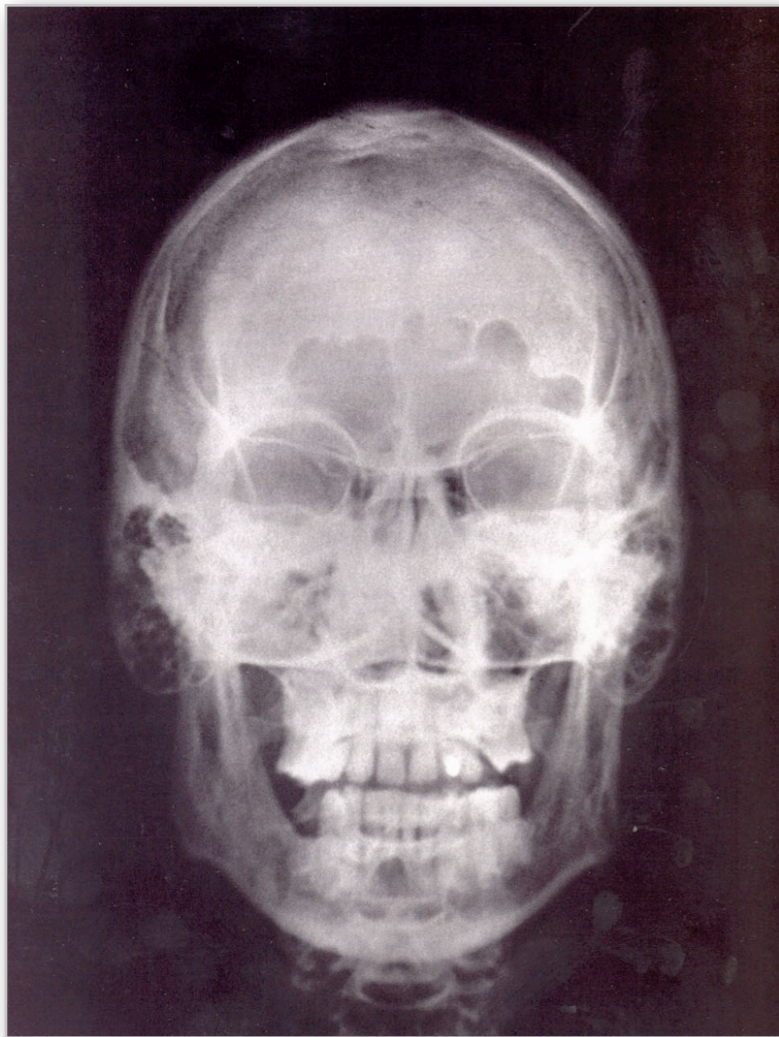
Genomics:
“Heatmap”



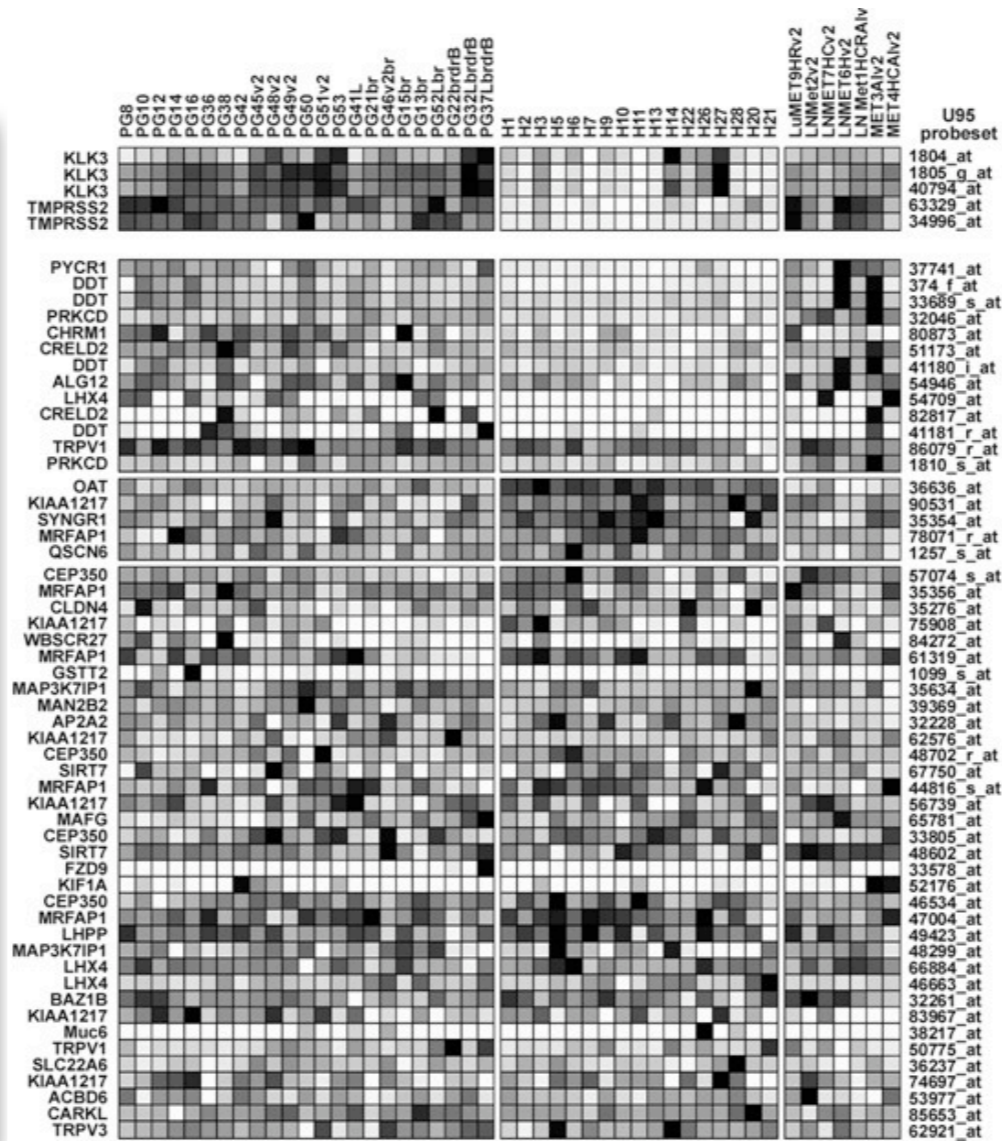
Astronomy:
Photograph

1 quantity

on 2 dimensions



Medicine:
X-Ray



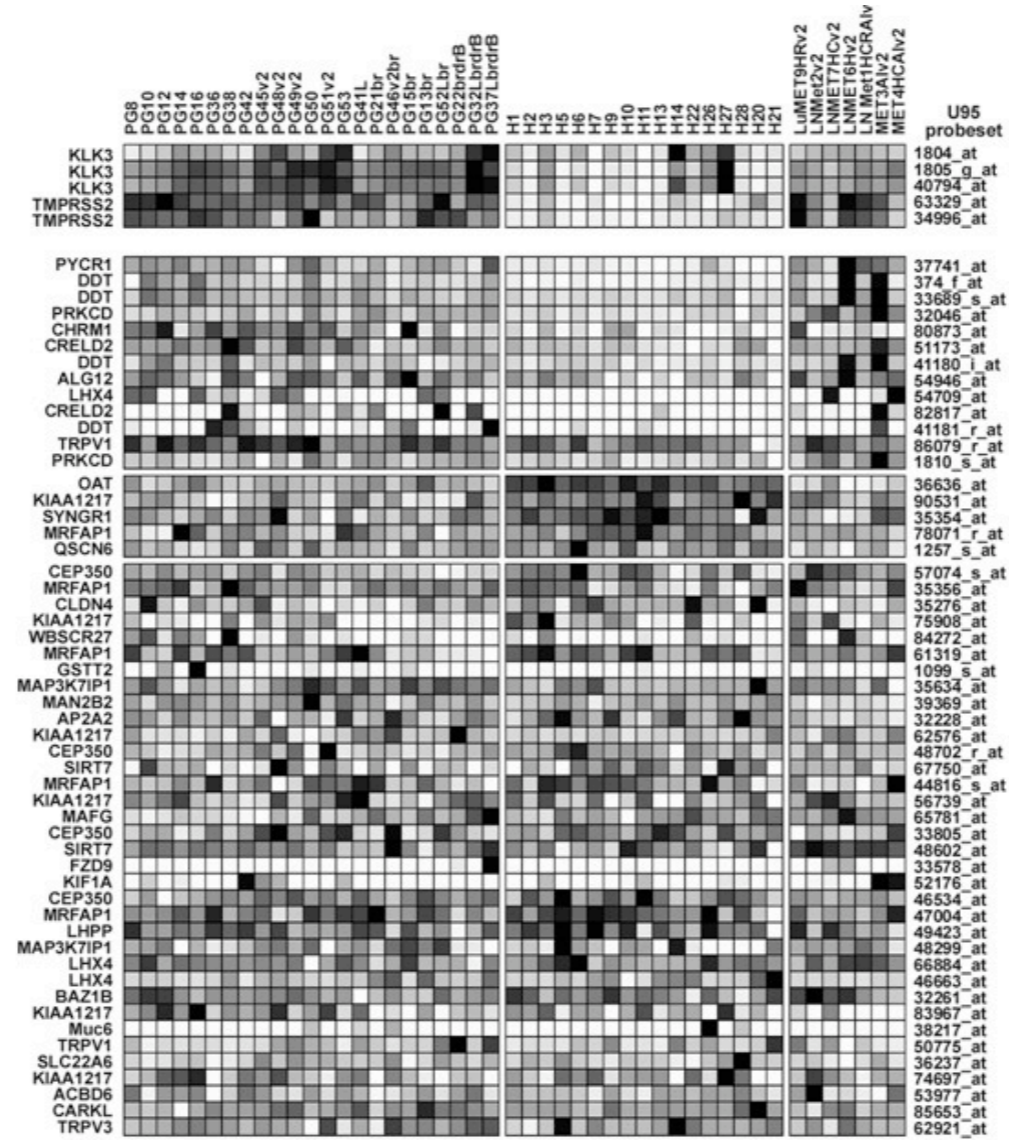
Genomics:
“Heatmap”



Astronomy:
Photograph

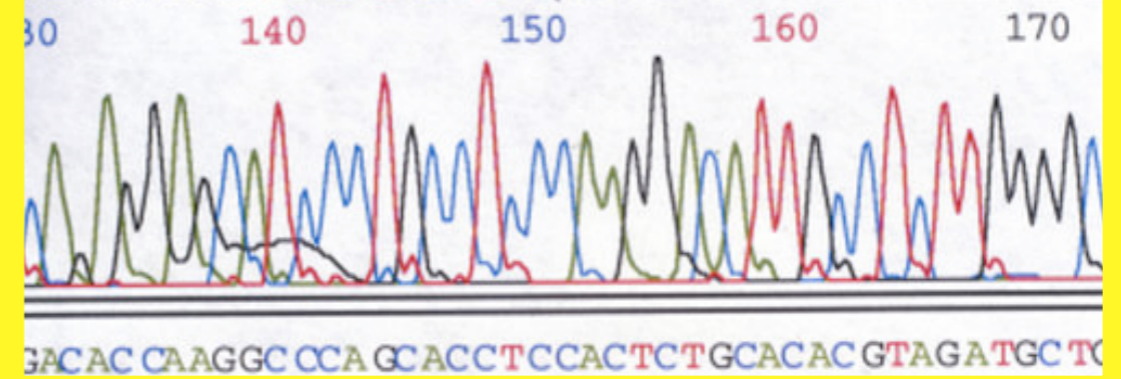
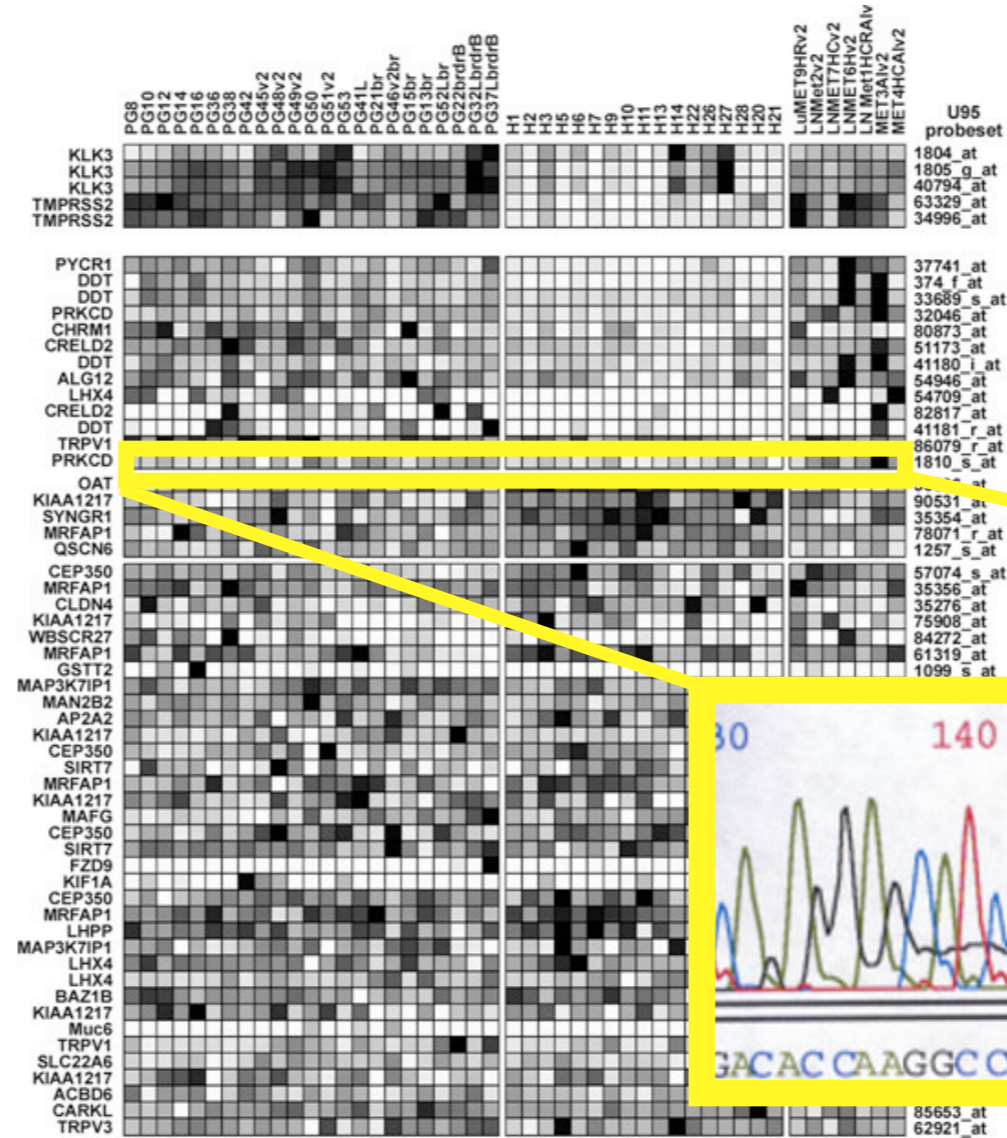
1 quantity

on 2 dimensions



1 quantity

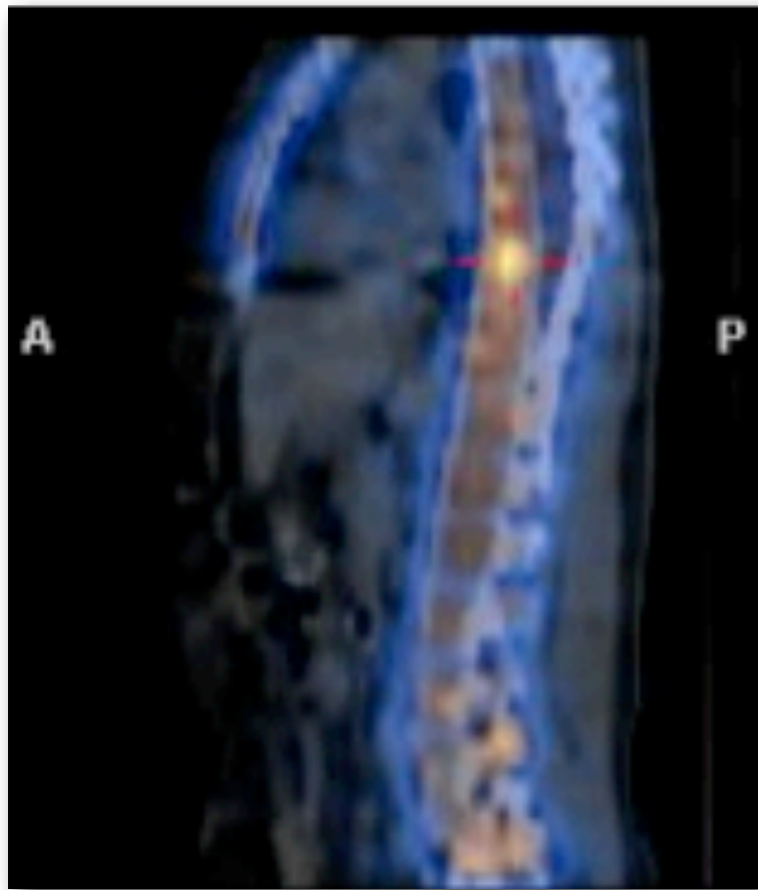
on 2 dimensions



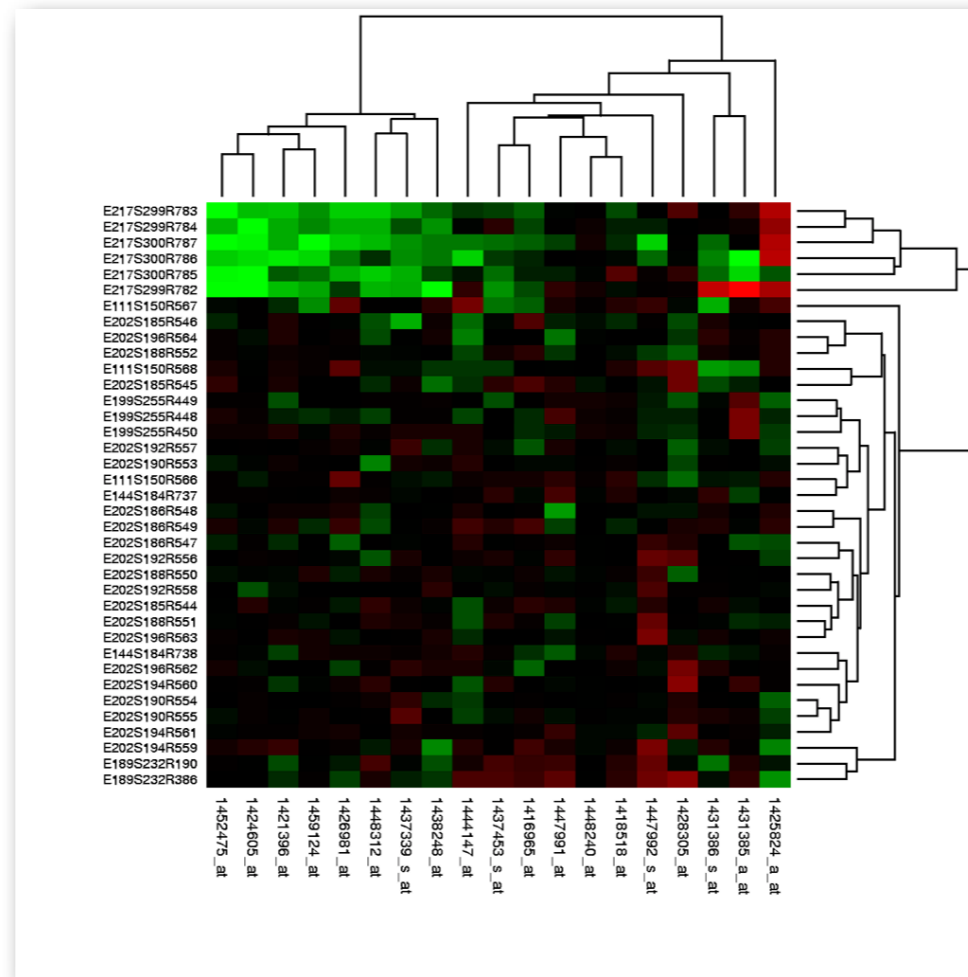
...on 1 dimension

> 1 quantity

on 2 dimensions



Medicine:
Multimodal Imaging



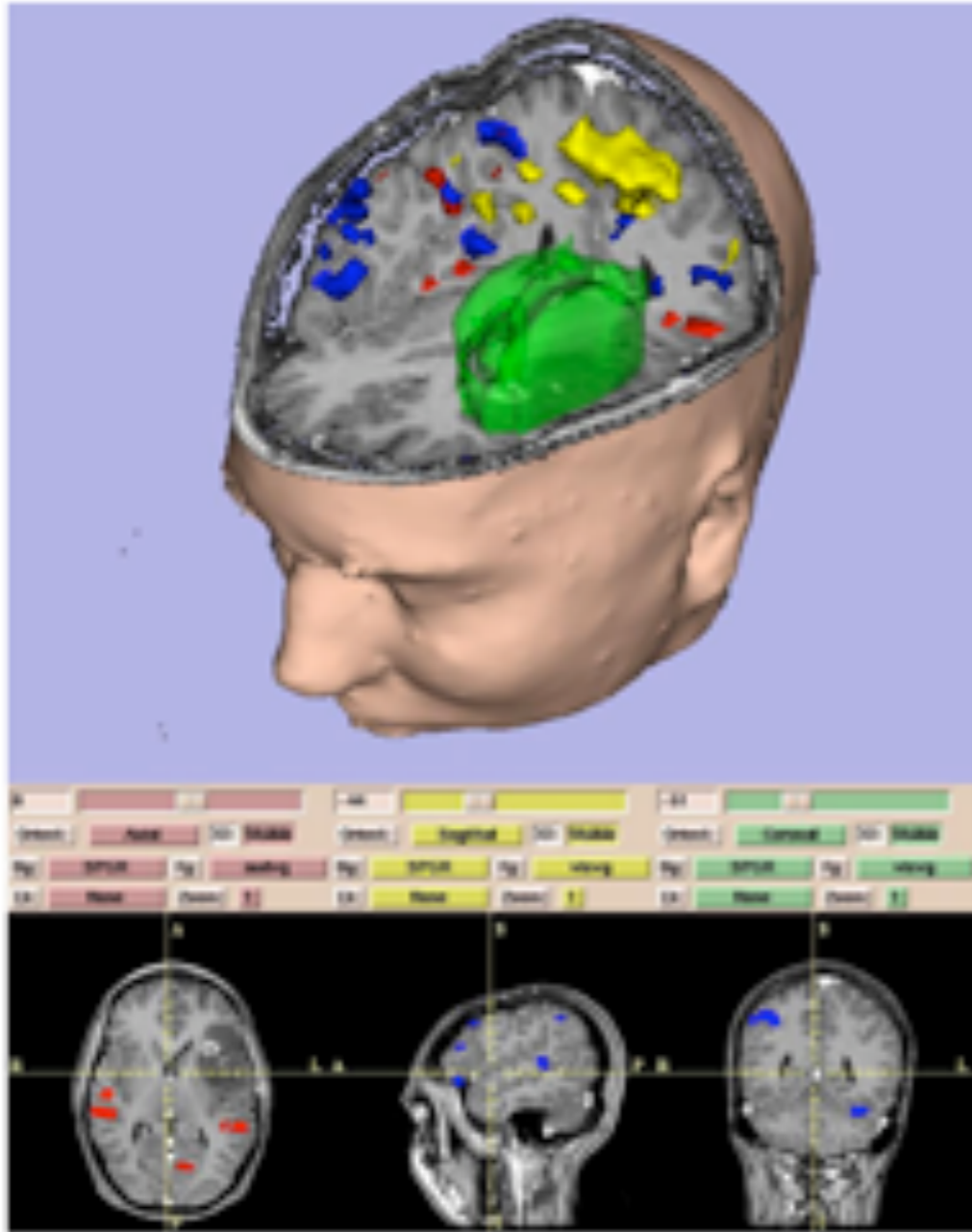
Genomics:
“Heatmap”



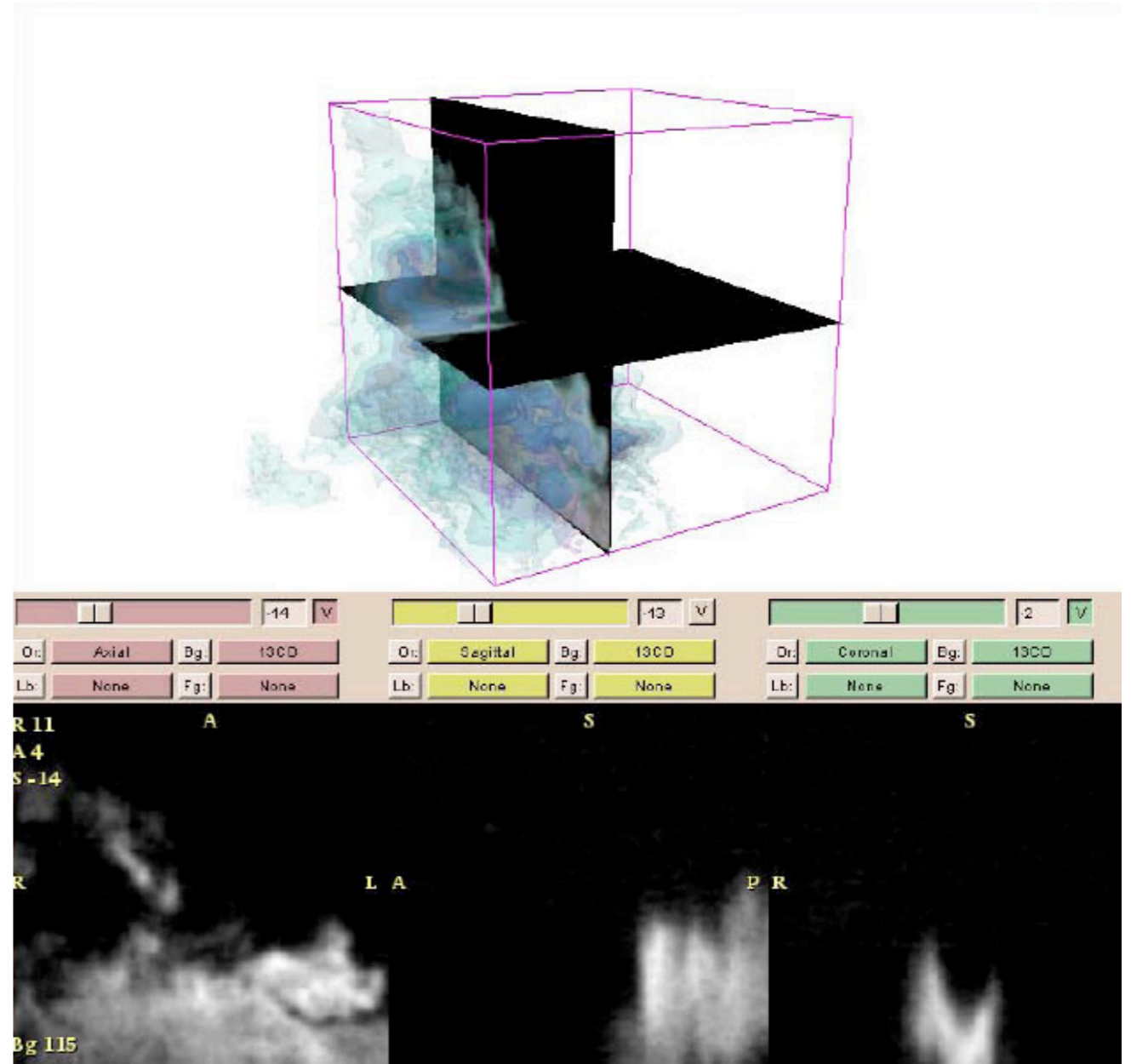
Astronomy:
Color Photograph

1 quantity

on 3 Dimensions



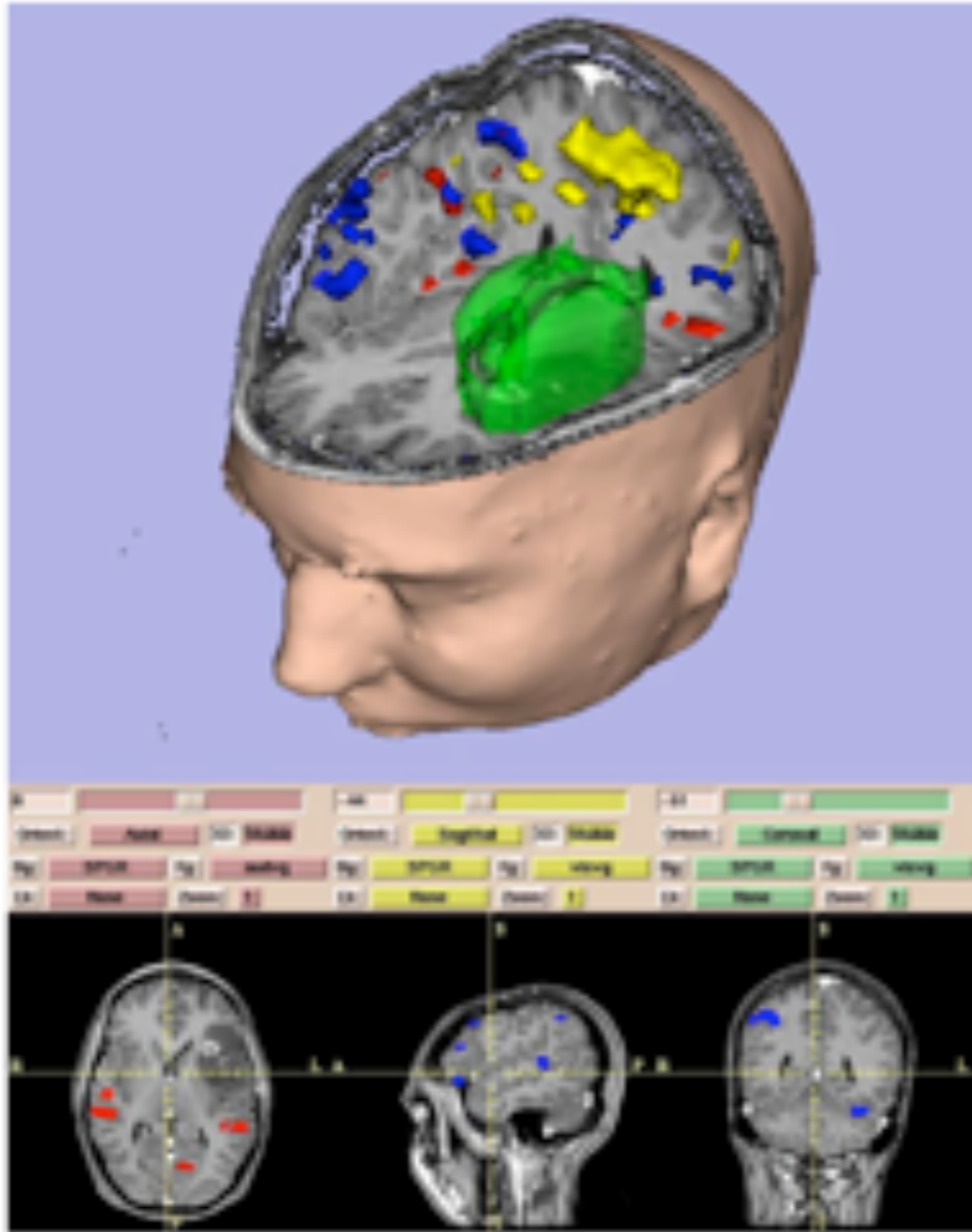
Medicine:
MRI



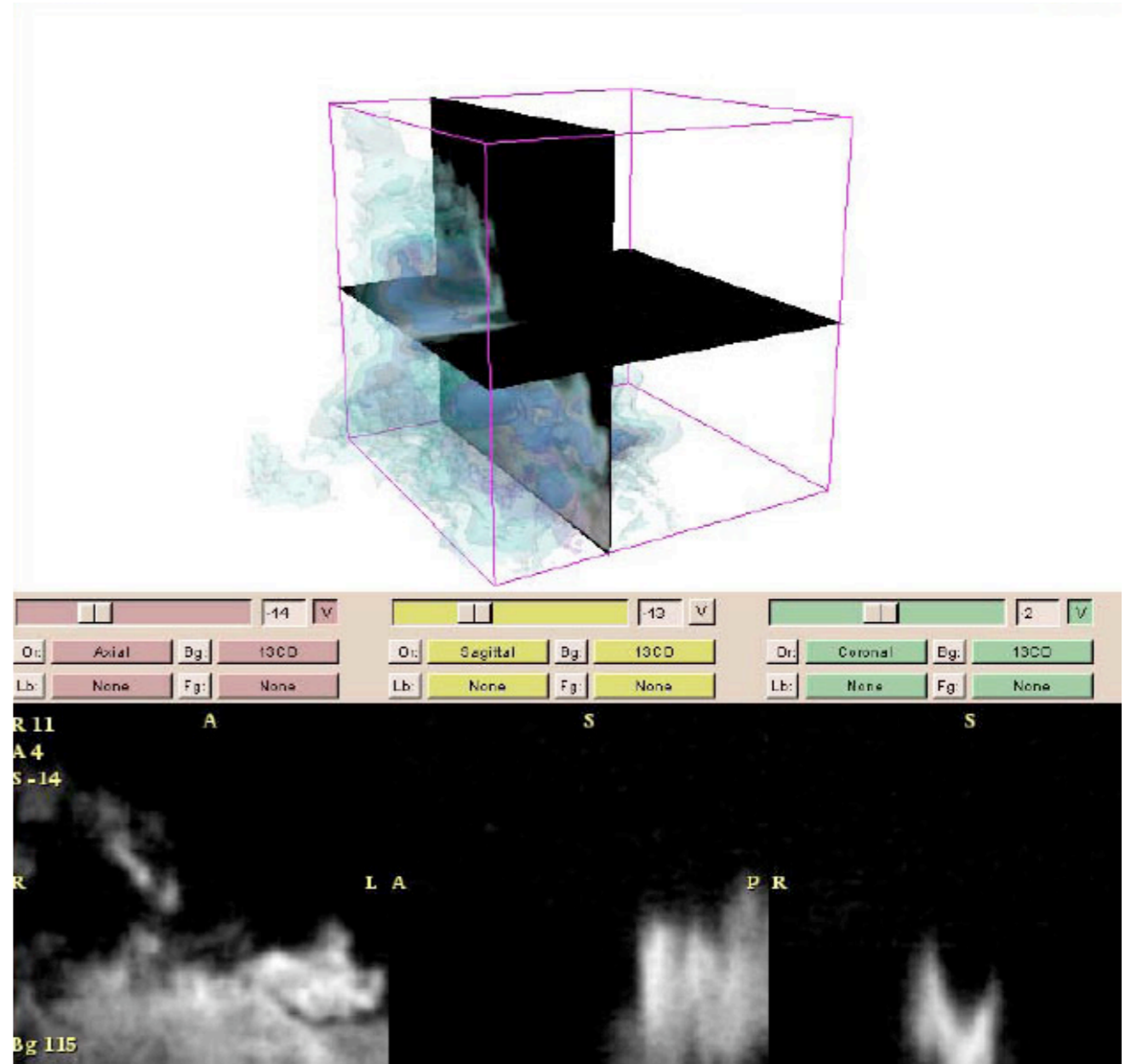
Astronomy:
Spectral-Line Data Cubes

1 quantity

on 3 Dimensions



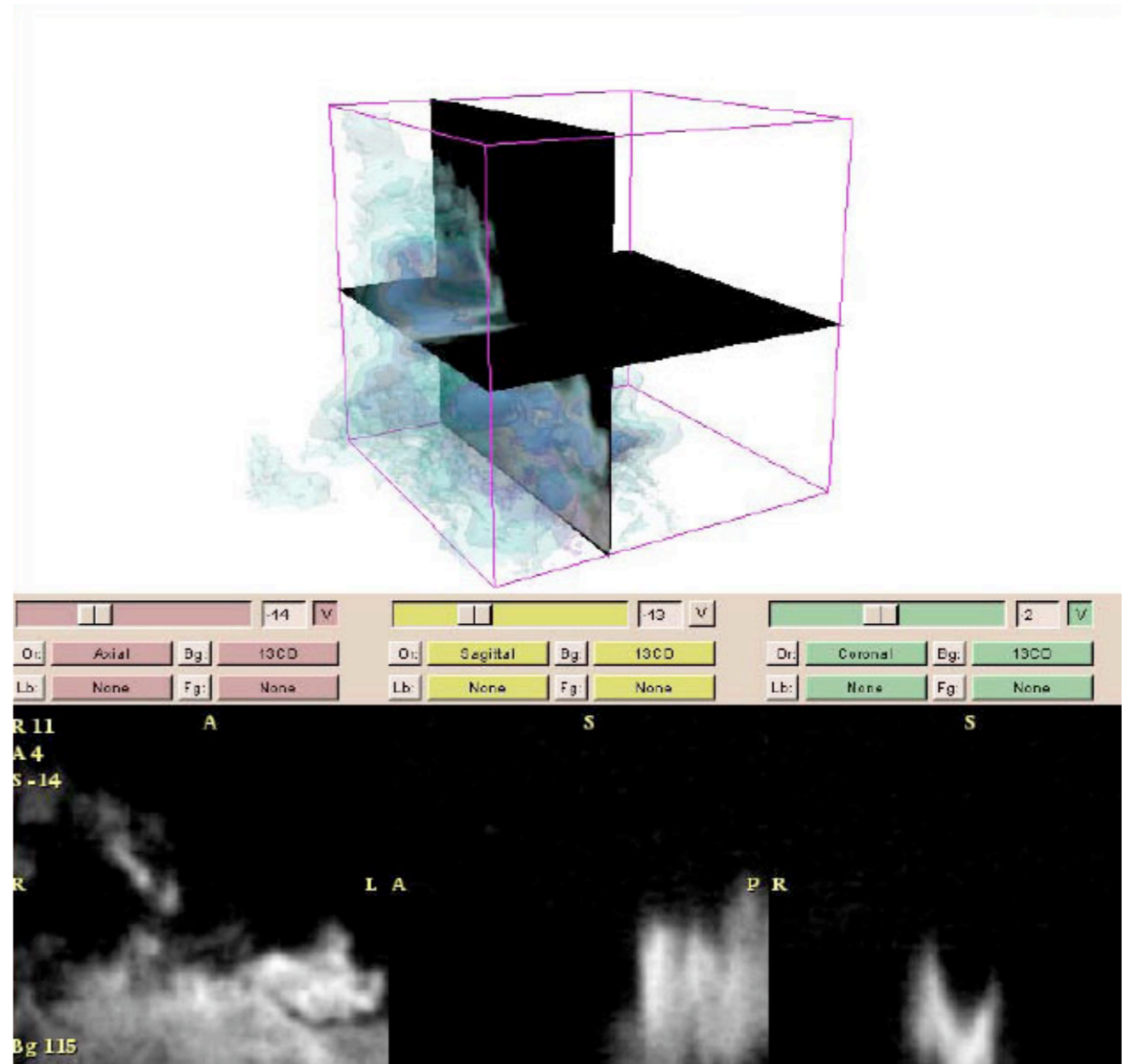
Medicine:
MRI



Astronomy:
Spectral-Line Data Cubes

1 quantity

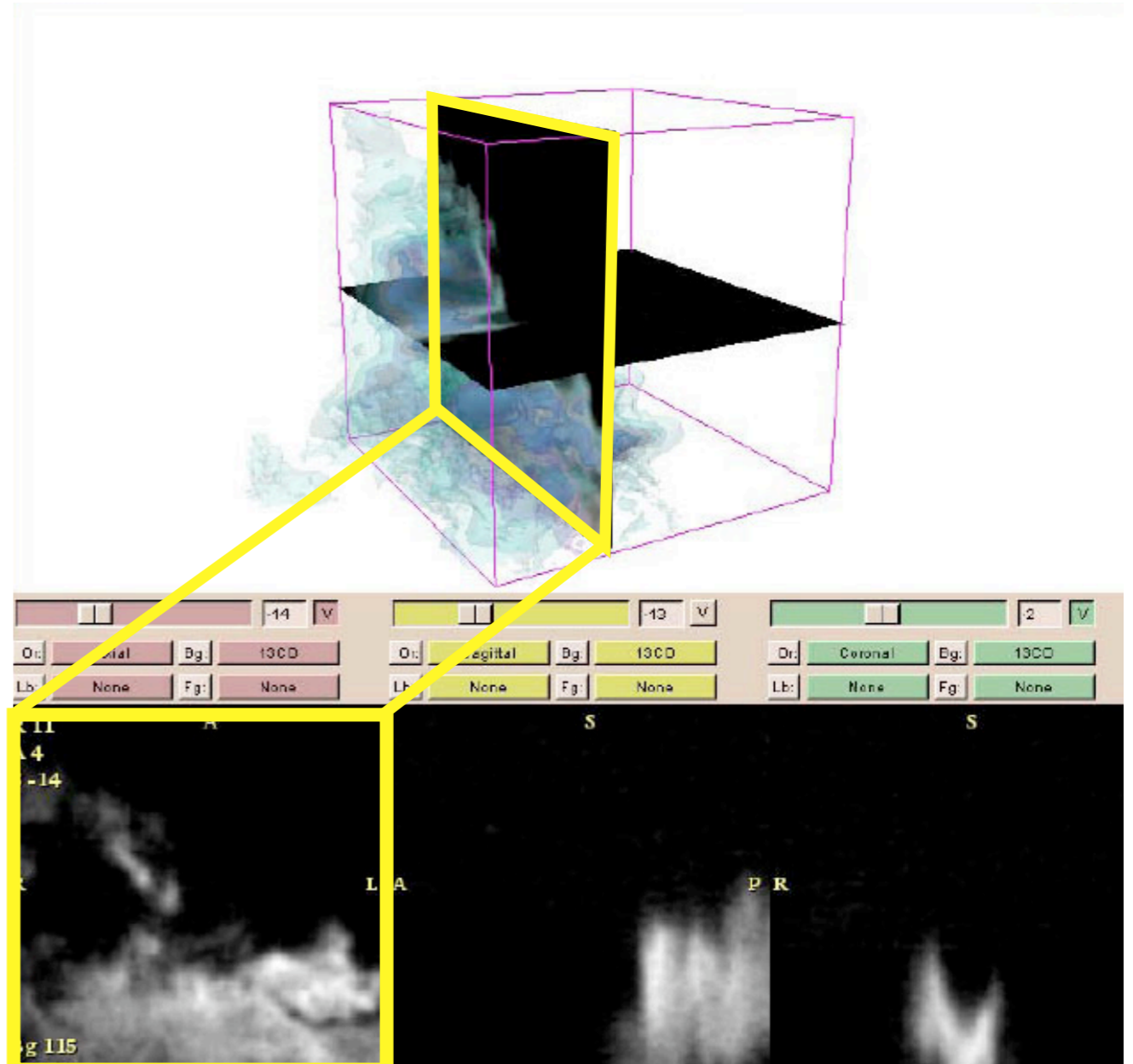
on 3 Dimensions



Astronomy:
Spectral-Line Data Cubes

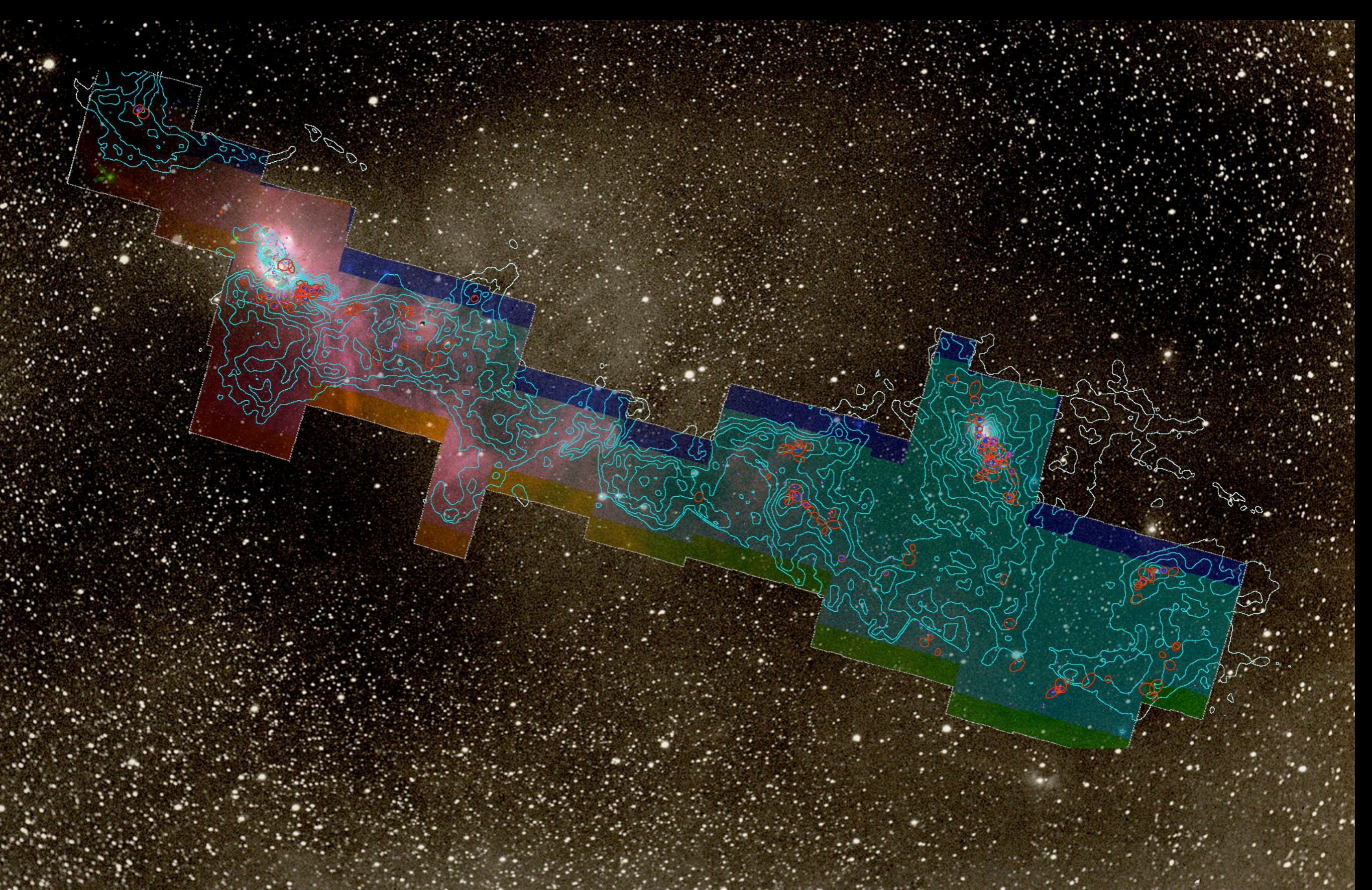
1 quantity

on 3 Dimensions



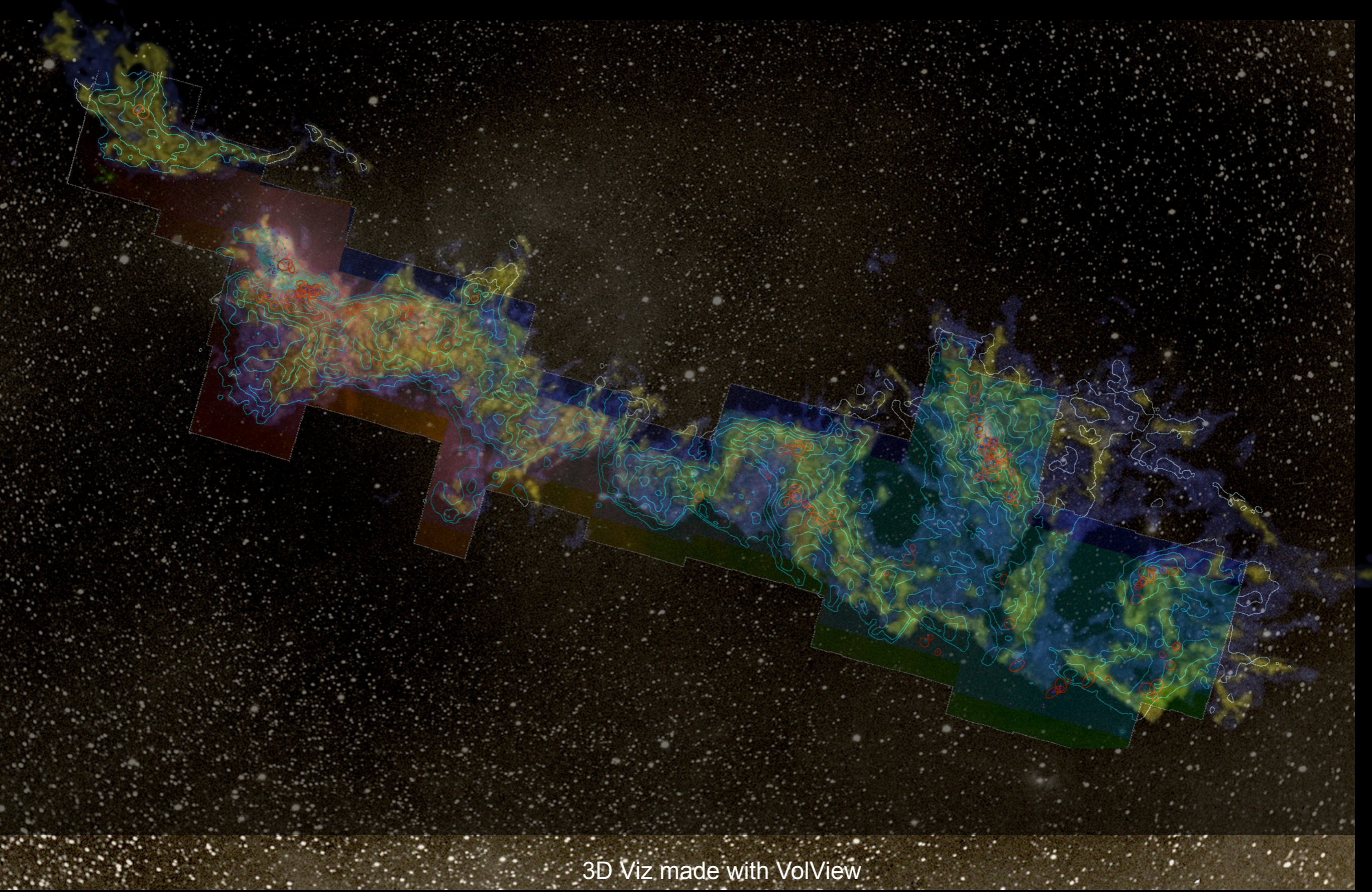
...in two dimensions

Astronomy:
Spectral-Line Data Cubes



AstronomicalMedicine@ **iig**

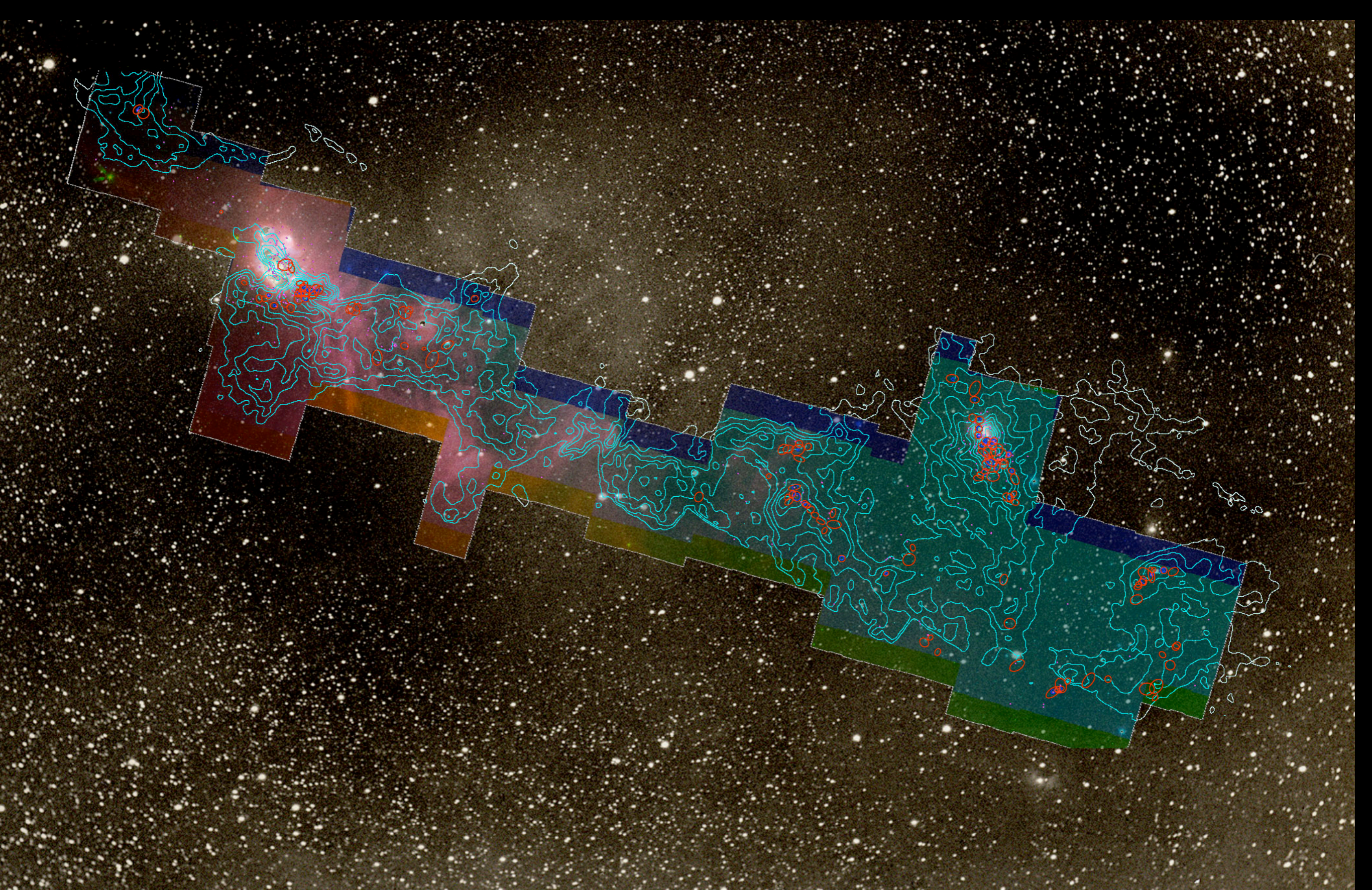
COMPLETE








3D Viz made with VolView

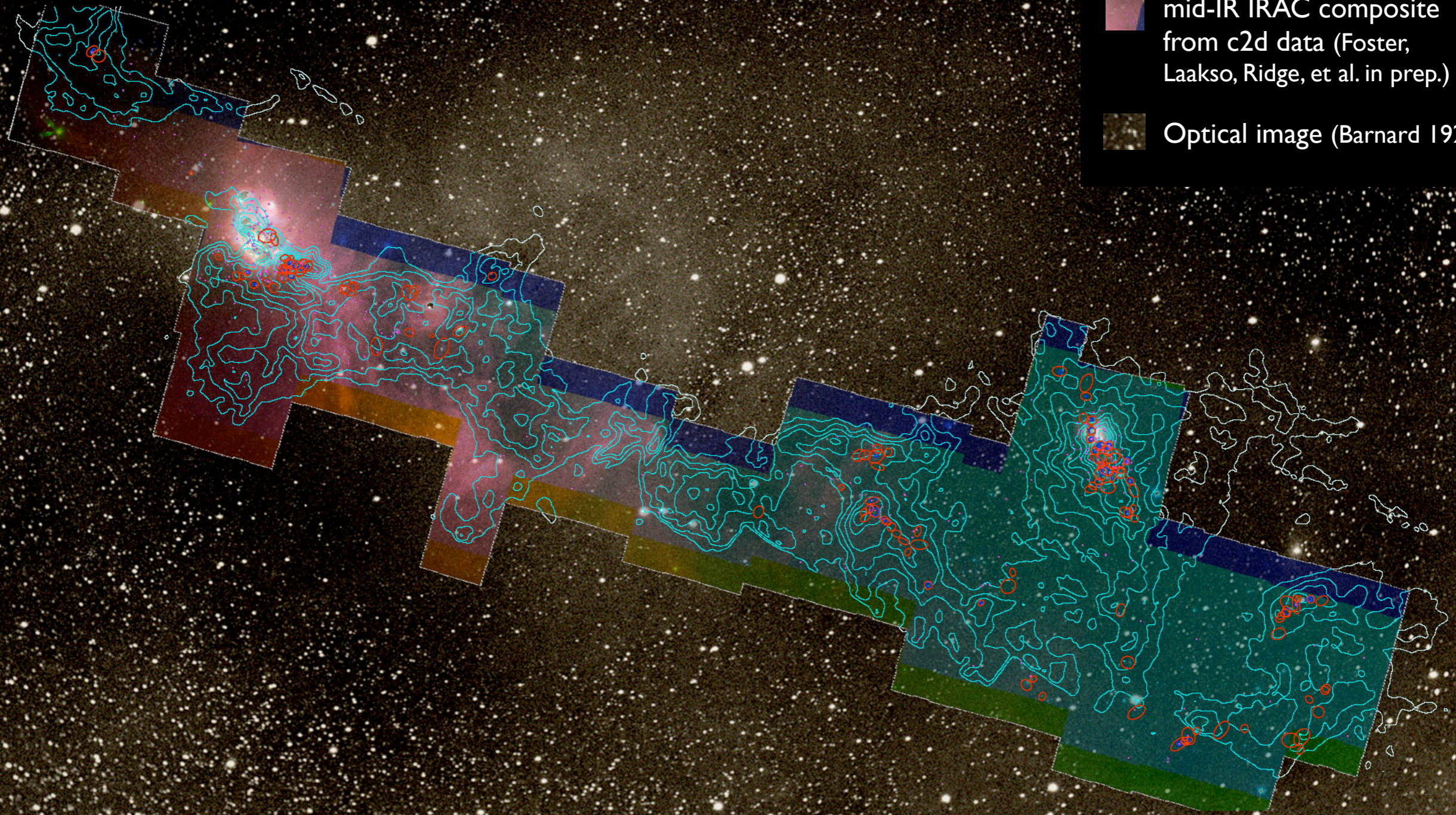
Astronomical**Medicine**@ **iig**

COMPLETE



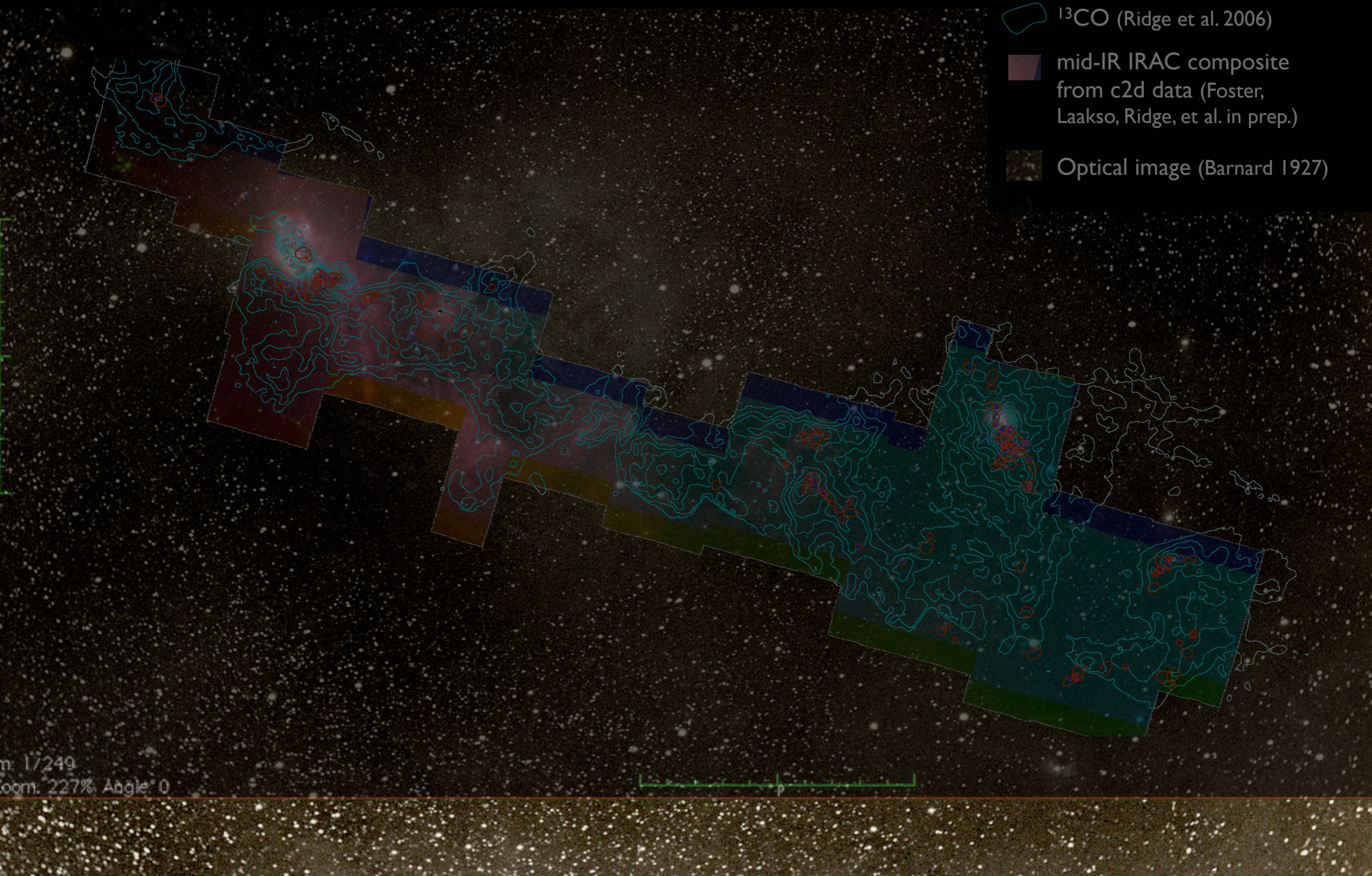
COMPLETE = COordinated Molecular Probe Line Exinction Thermal Emission

-  mm peak (Enoch et al. 2006)
-  sub-mm peak (Hatchell et al. 2005, Kirk et al. 2006)
-  ^{13}CO (Ridge et al. 2006)
-  mid-IR IRAC composite from c2d data (Foster, Laakso, Ridge, et al. in prep.)
-  Optical image (Barnard 1927)








COMPLETE = COordinated Molecular Probe Line Exinction Thermal Emission

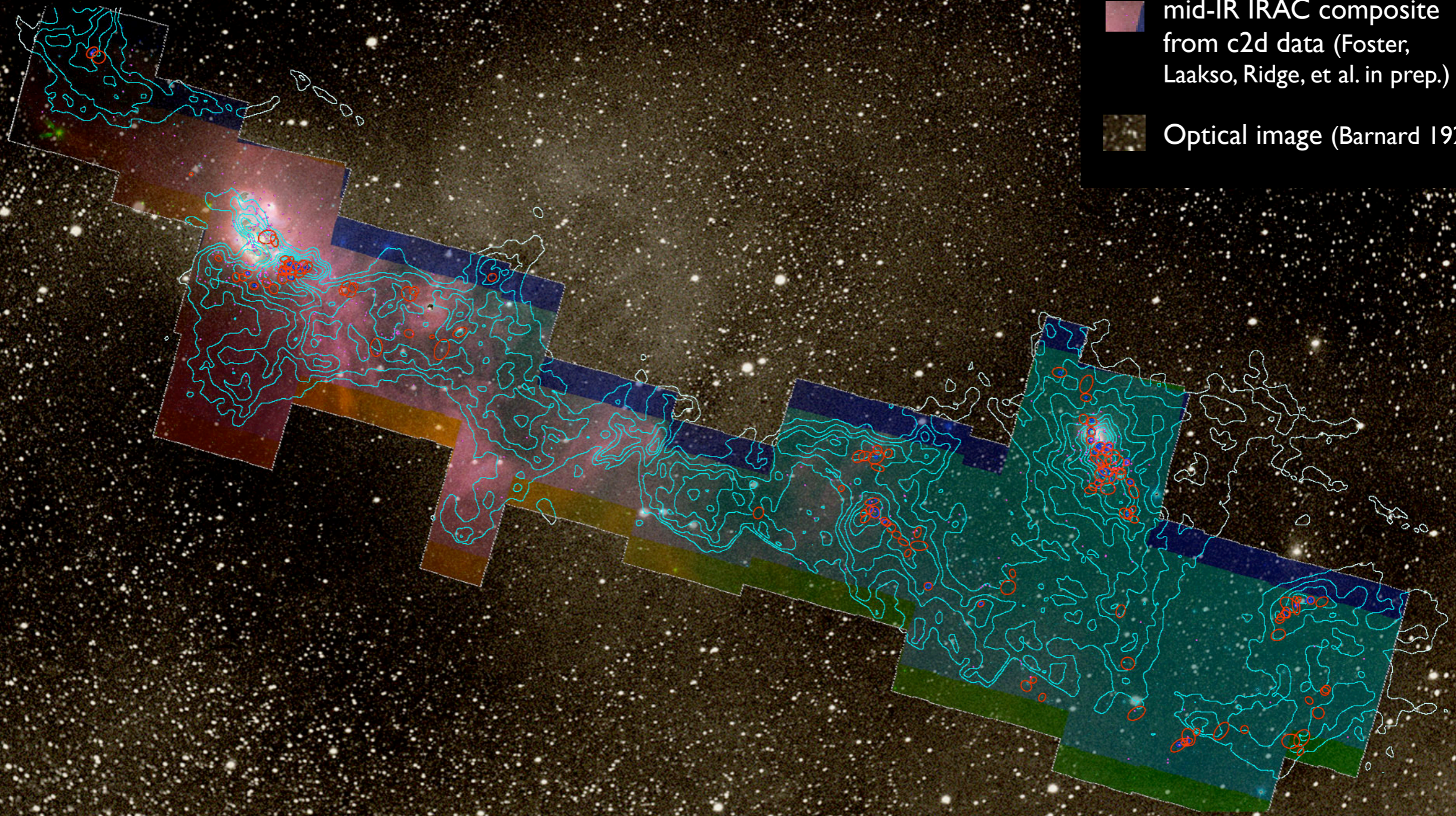
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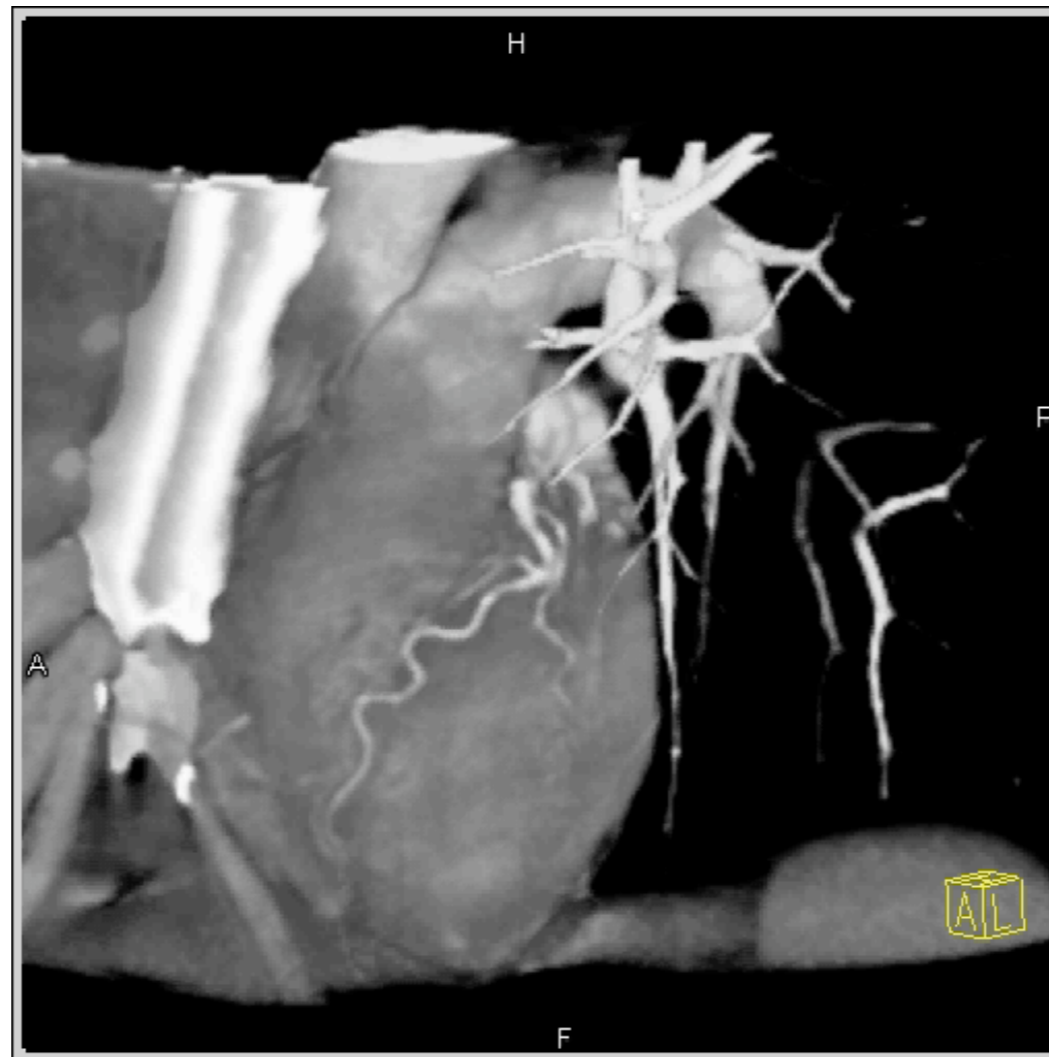
m: 1/249
zoom: 227% Angle: 0

COMPLETE = COordinated Molecular Probe Line Exinction Thermal Emission

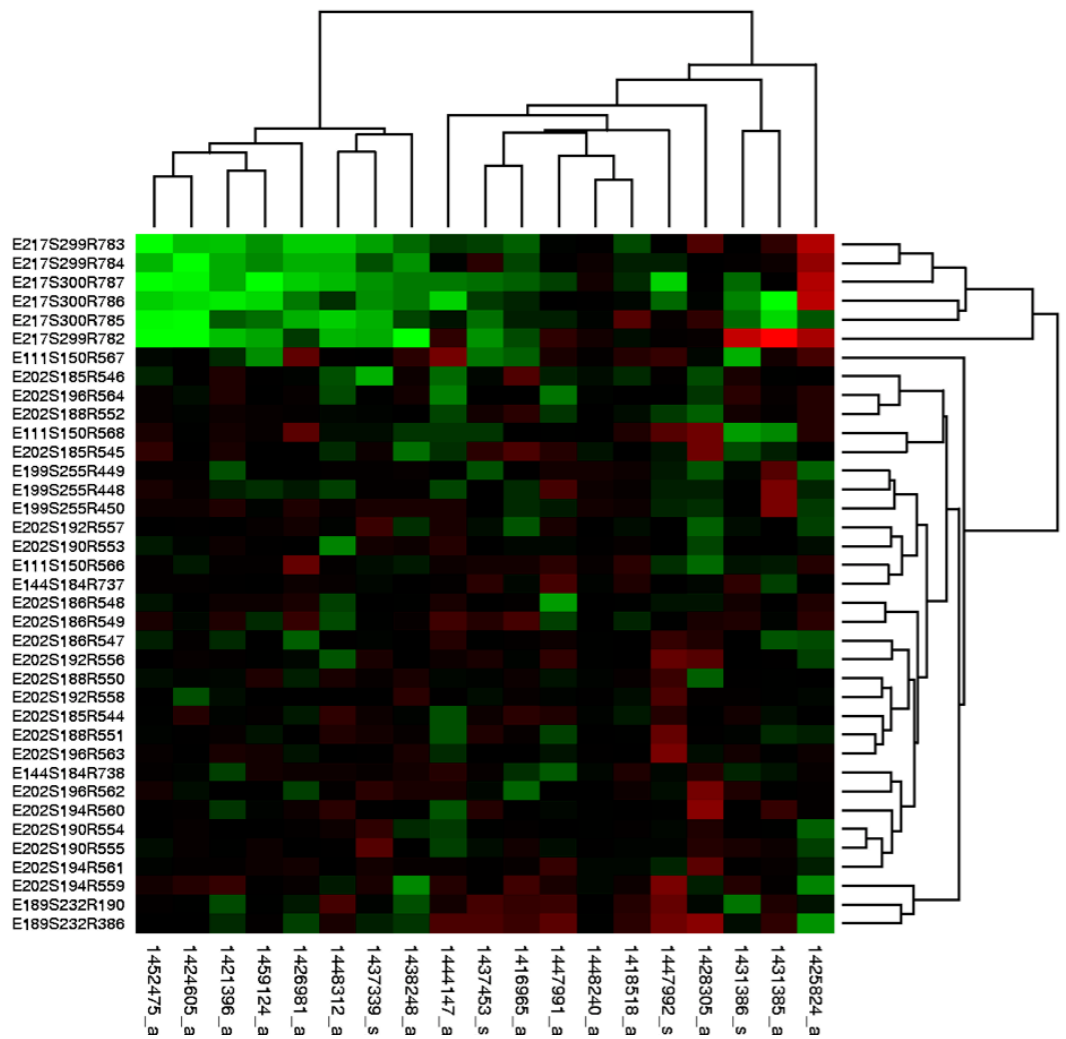
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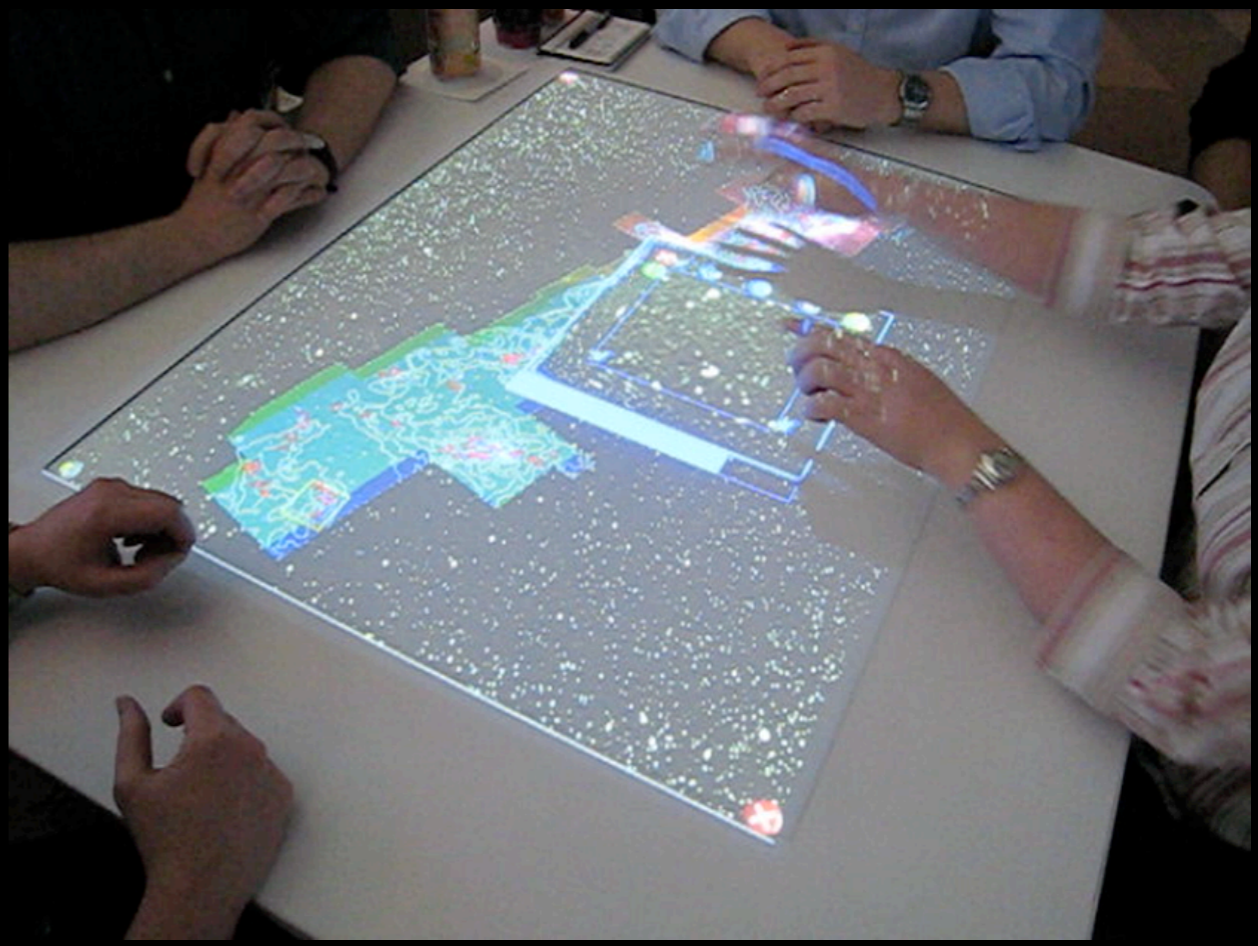
I quantity | *on 4 Dimensions*



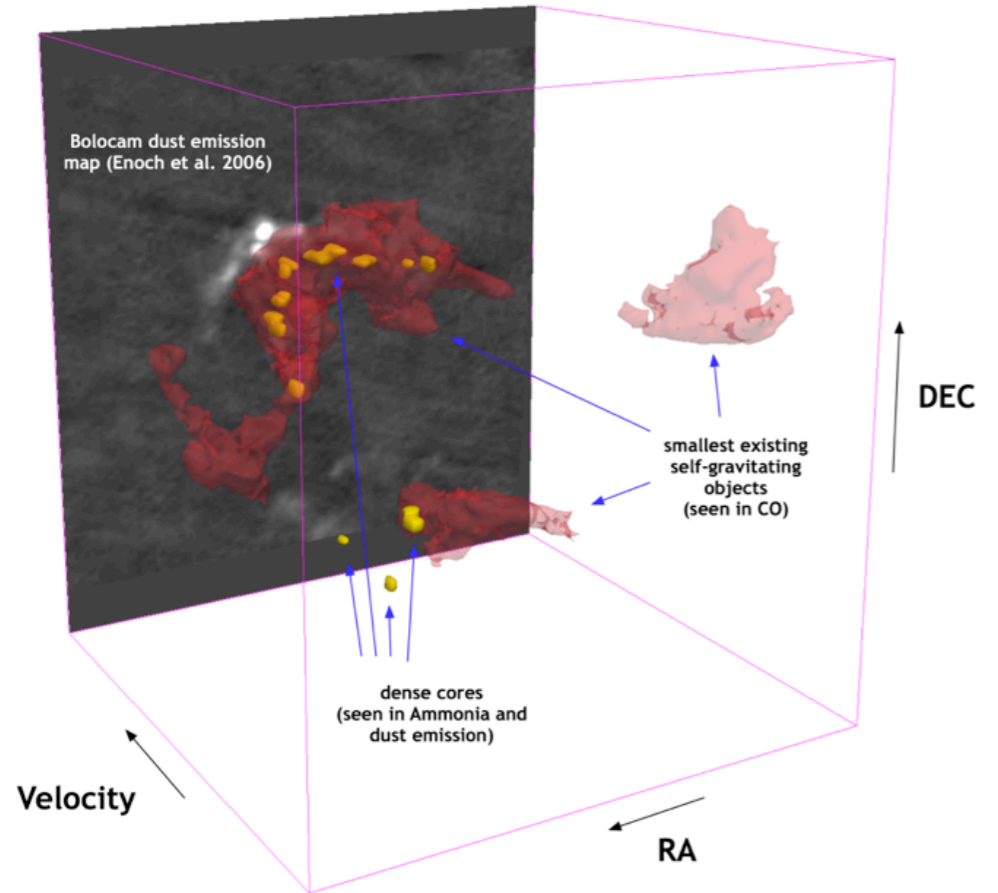
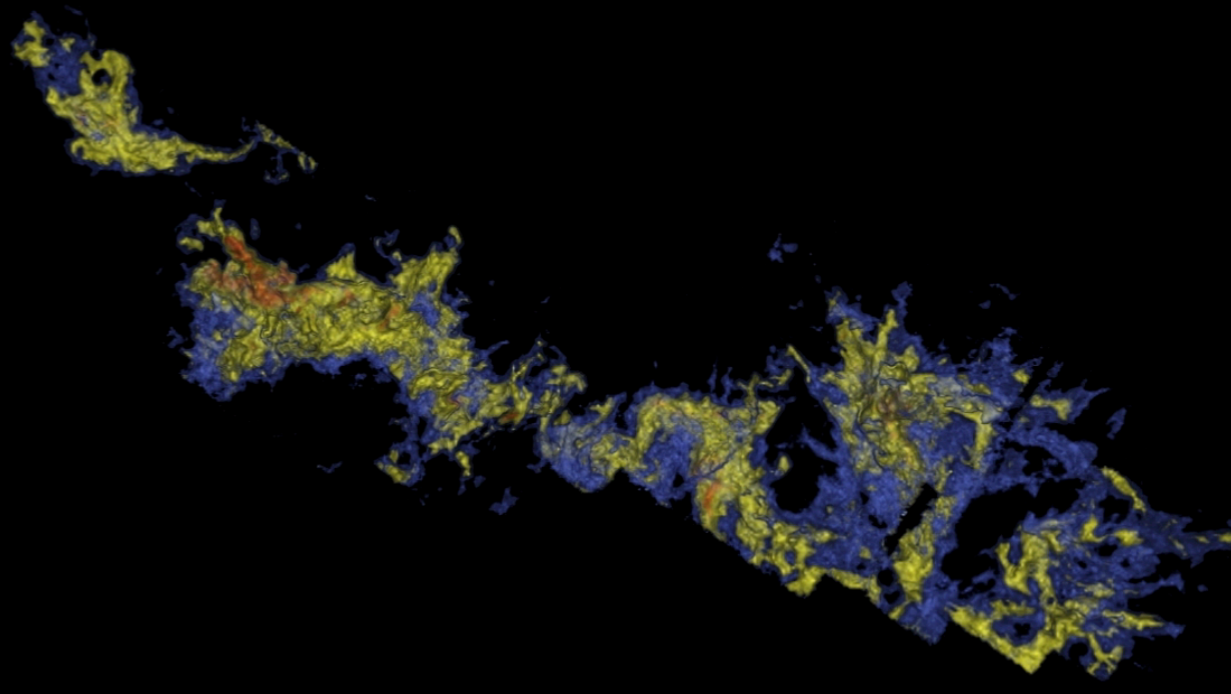
Medicine:
Time-Resolved 3D Imaging



Seeing



Science



Seeing Science (this morning & in the future)

- * evolution of dimensions & data over time
- * beyond 4D...
- * too much data?
- * analysis and statistics
- * tools for display

The Scientists' Discovery Room: Version 0.01



movie courtesy Daniel Wigdor, taken at MERL, Kendall Square, Cambridge