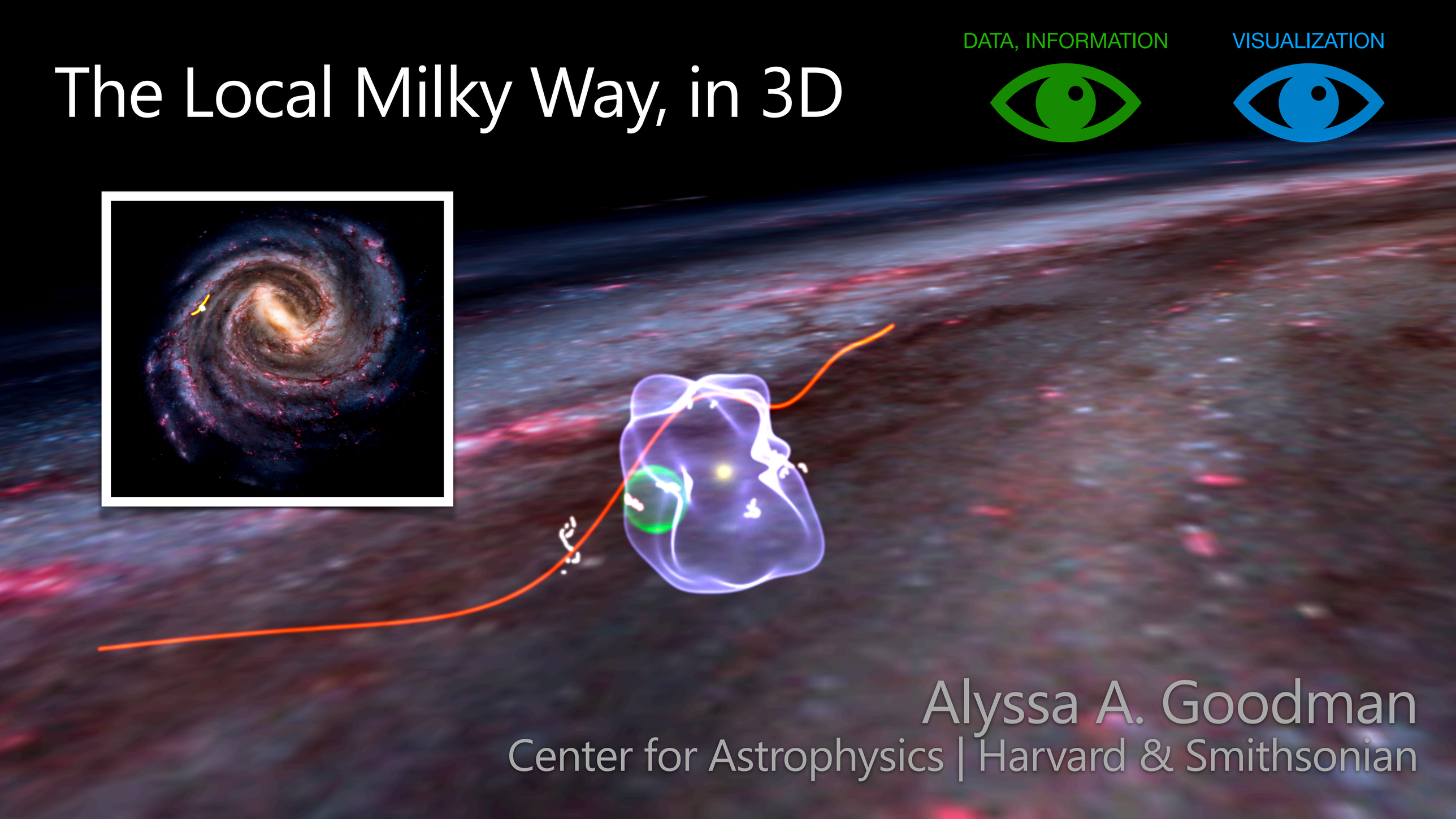
The Local Milky Way, in 3D

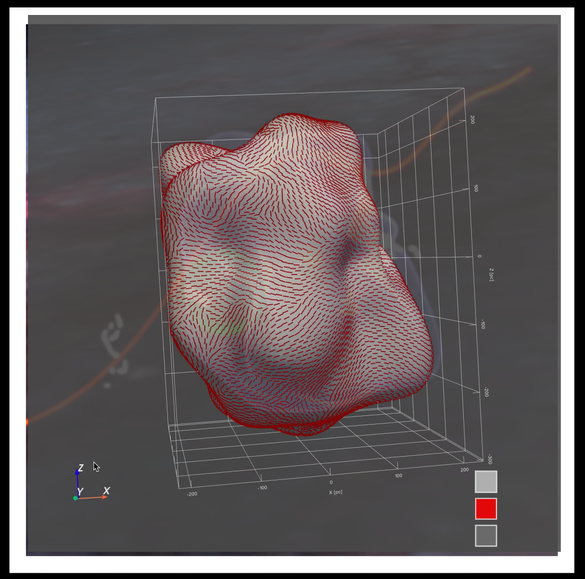


Alyssa A. Goodman
Center for Astrophysics | Harvard & Smithsonian

I want your

DATA, INFORMATION

to see our neighborhood
in 3D (and 2D, and more).

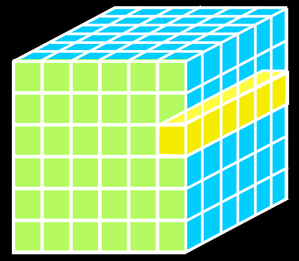


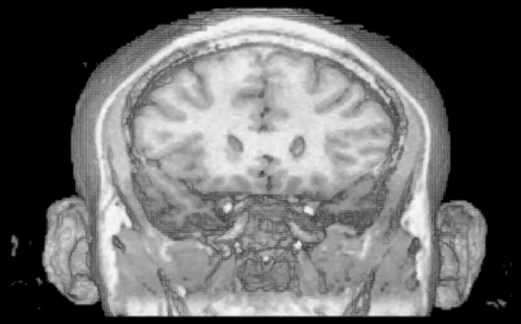
An example of why

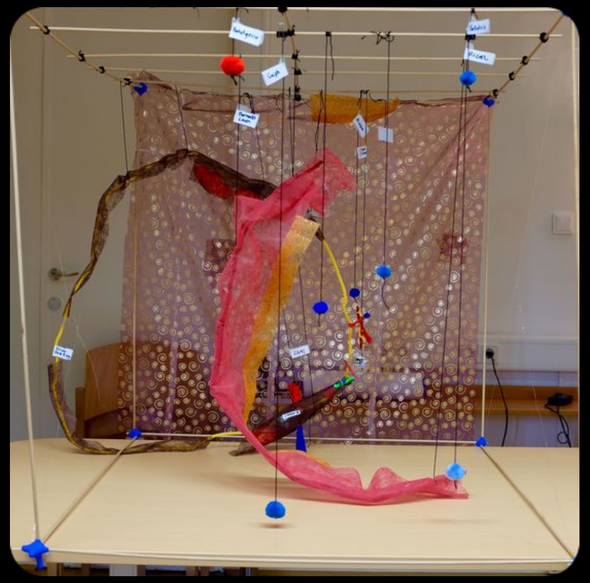
VISUALIZATION

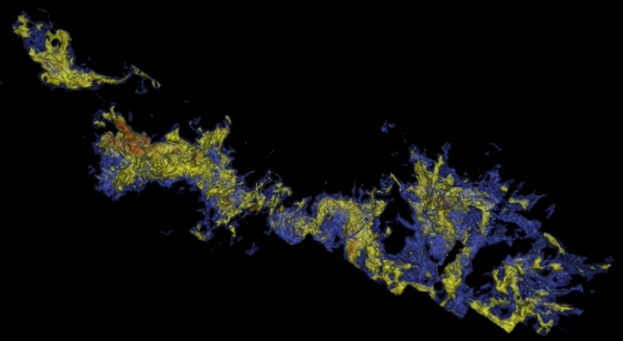
choices matter.

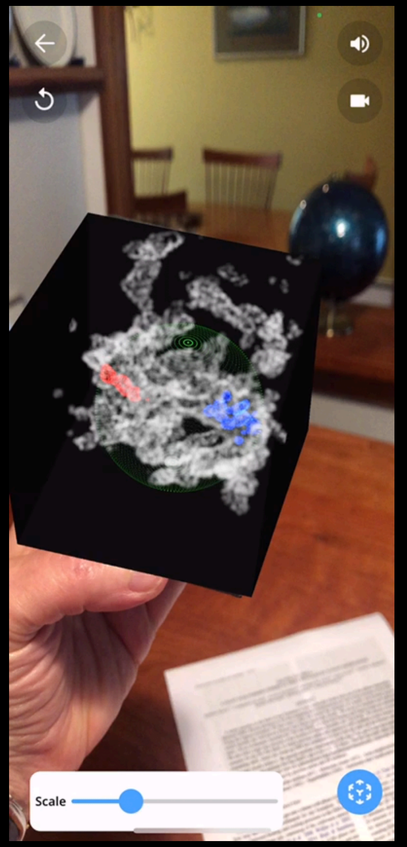
“DATA, DIMENSIONS, DISPLAY” a.k.a. “DDD” (a.a.k.a. my personal quest)



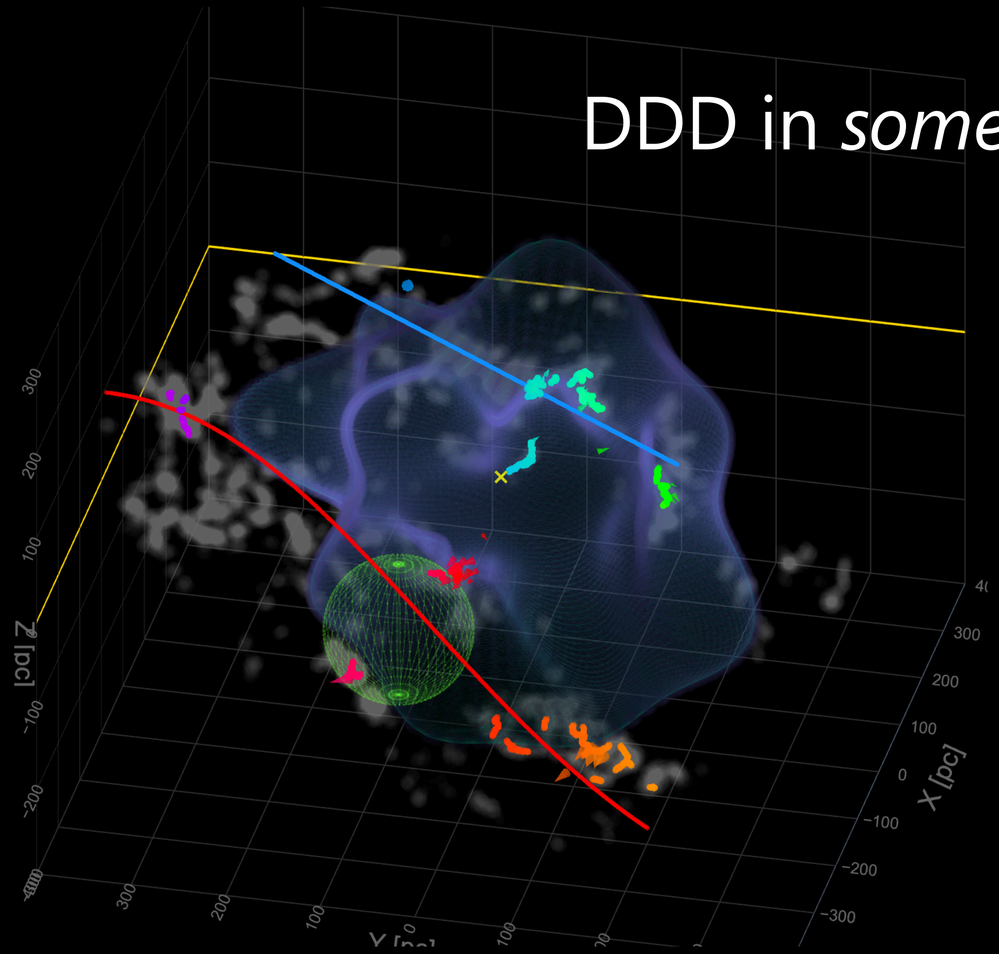




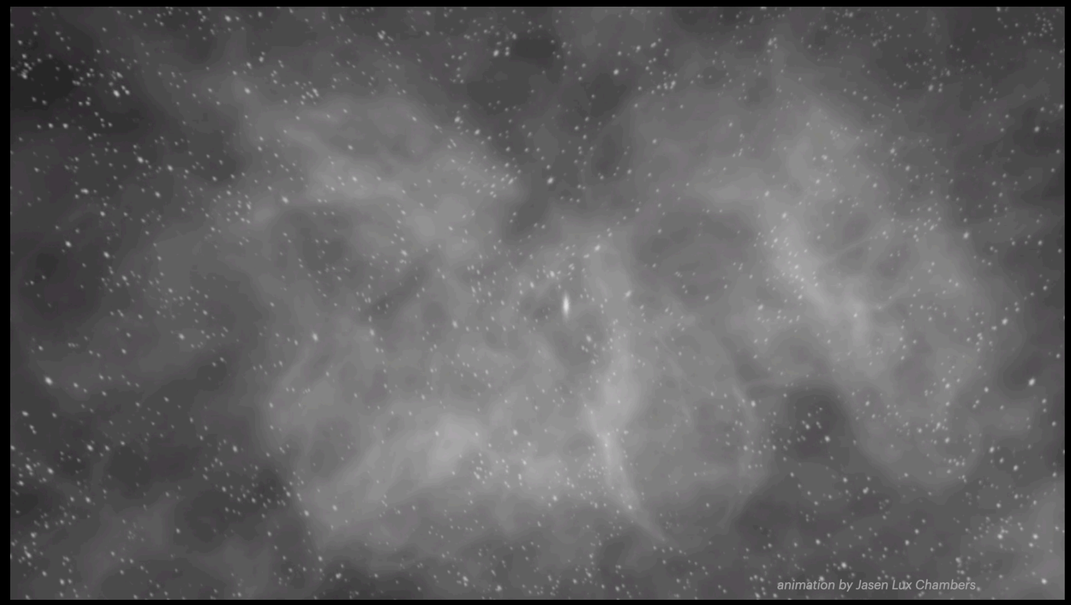


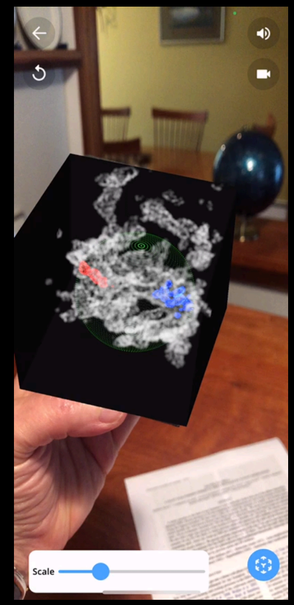


DDD in *some* of the Local ISM, recently



Zucker et al. 2022

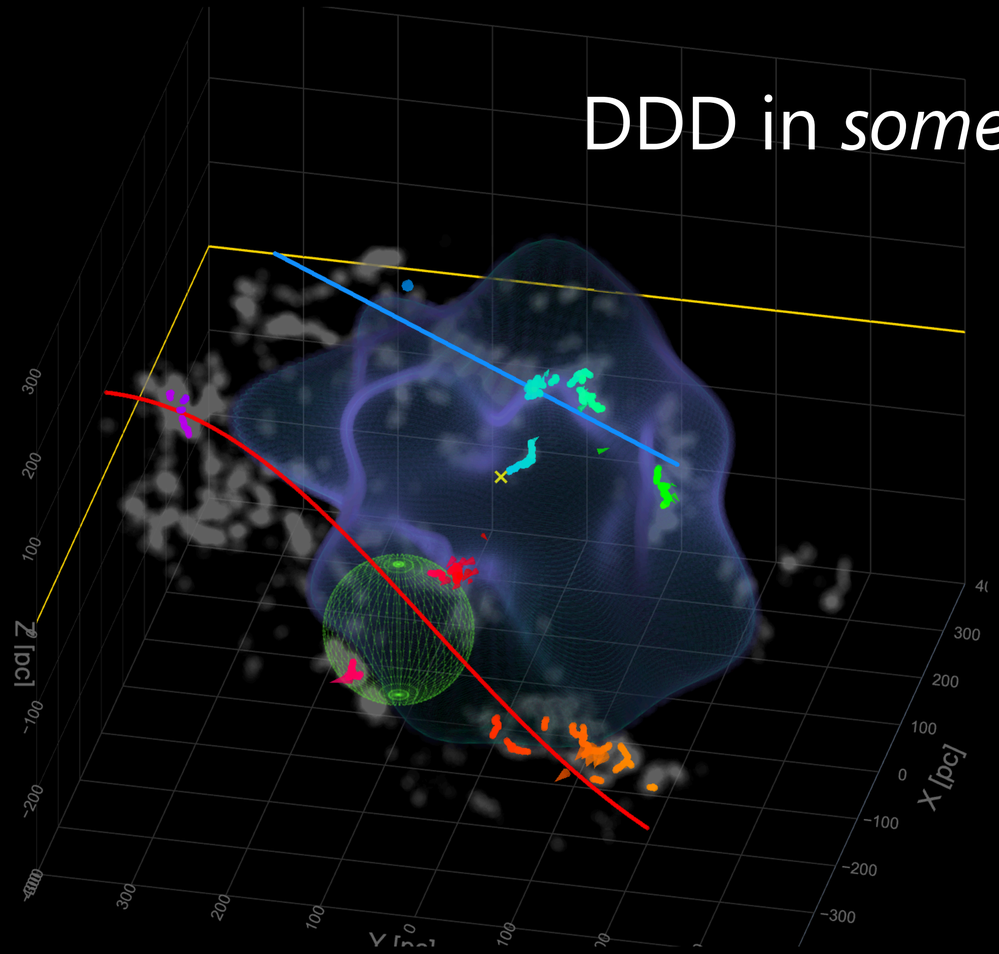




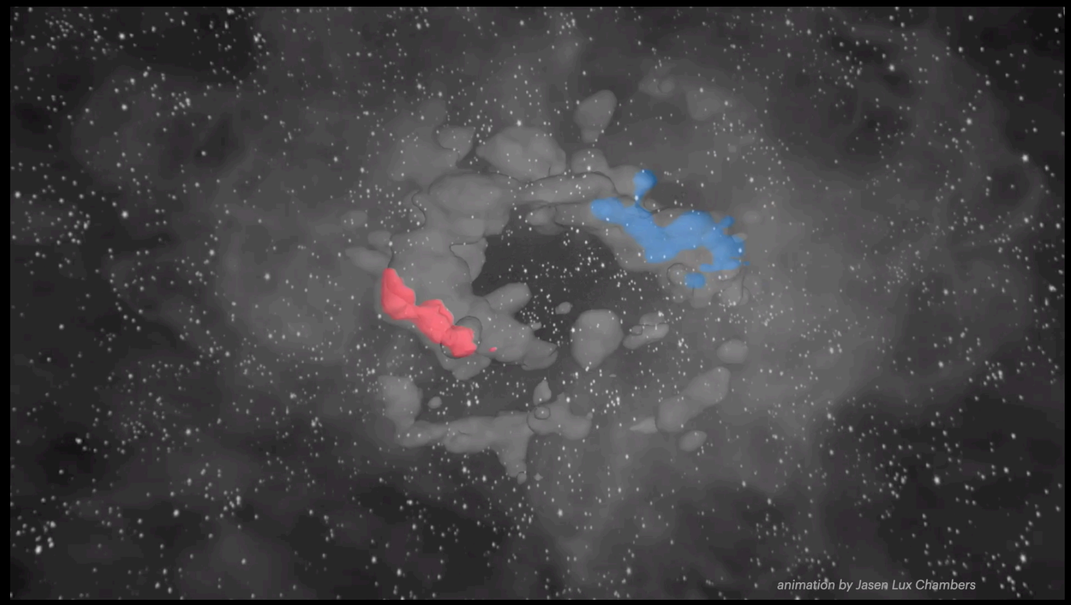
Bialy et al. 2021

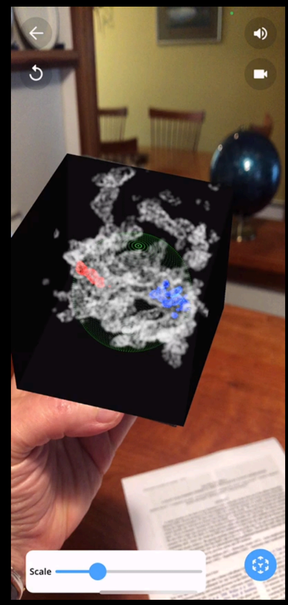
Start the presentation to see live content. Still no live content? Install the app or get help at **PollEv.com/app**

DDD in *some* of the Local ISM, recently



Zucker et al. 2022





Bialy et al. 2021

GOAL = DDD in *all* of the Local Milky Way *as we know it*

***great* 1D, 2D** and **3D** data manipulation, flexible architecture facilitating plug-ins, data transfer, and interactive data exploration; "glupyter" flavor runs in web pages

glue
multidimensional data exploration

CosmicDS

Prototype plug-in in-use (e.g. Radcliffe Wave on Hayden Planetarium dome

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Prototype plug-in shows WWT images in context in 3D.

OpenSpace

***great* 2D** object and all-sky images
limited 3D functionality

limited 2D all-sky images
***great* 3D** functionality

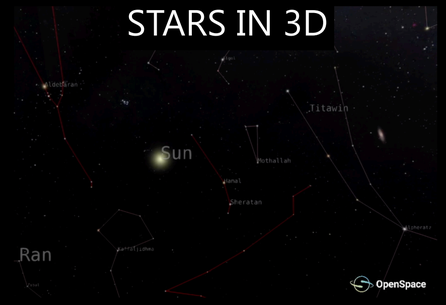
The "Perseus-Taurus Superbubble"
a demo of the need for 2D-3D contextualization functionality

This video was composited using the WWT and OpenSpace, making some use of prototype plug-ins, but 2D and 3D imagery was aligned manually by experts. As a generalizable STEM concept, it explains the deceptive "forced perspective" made possible in when objects at very different distances, in 3D, appear to touch in 2D.

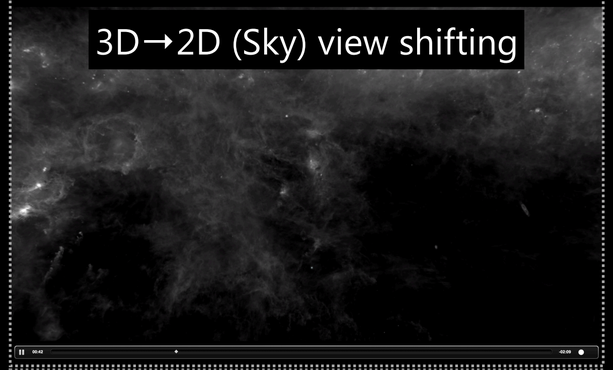
VISUALIZATION FEATURES

OVERVIEW CARTOON

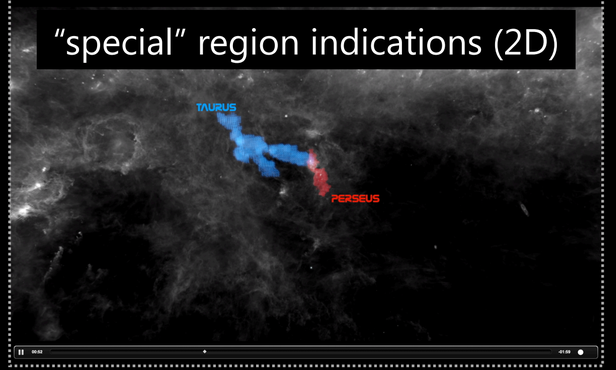
STARS IN 3D



3D→2D (Sky) view shifting

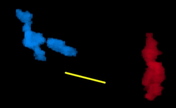


“special” region indications (2D)

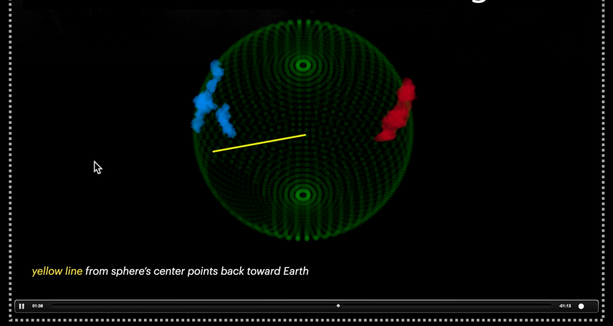


pop-outs

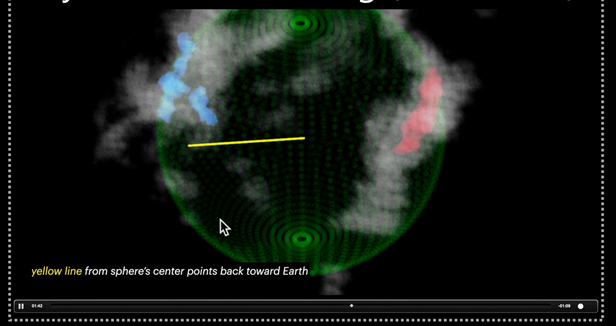
interaction, with user data added



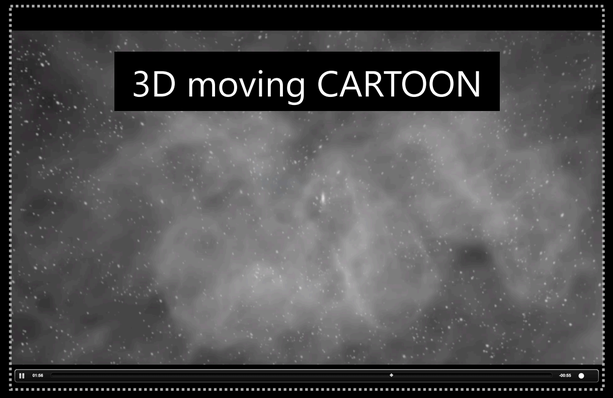
models, direction, scales, grids



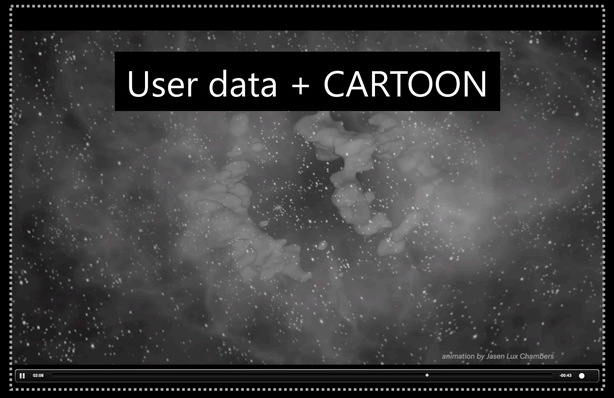
layer control + slicing (not shown)



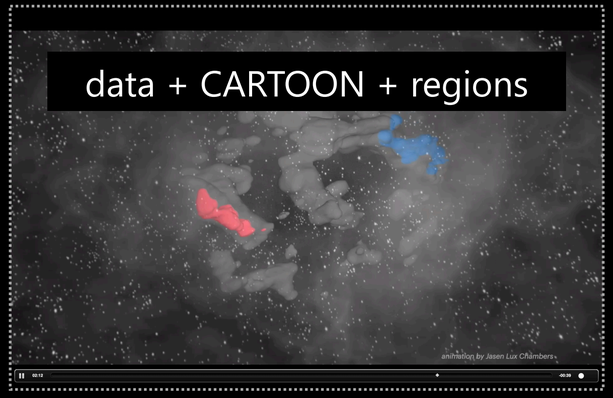
3D moving CARTOON



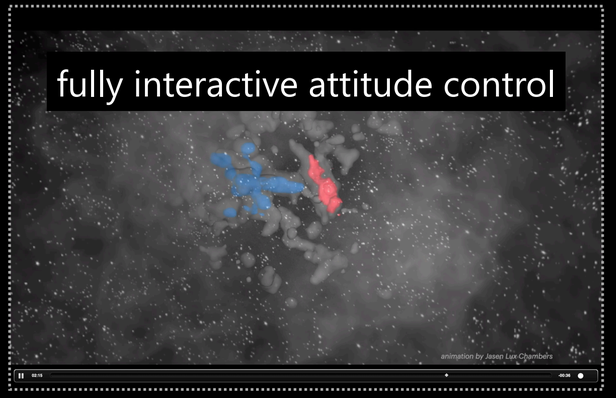
User data + CARTOON



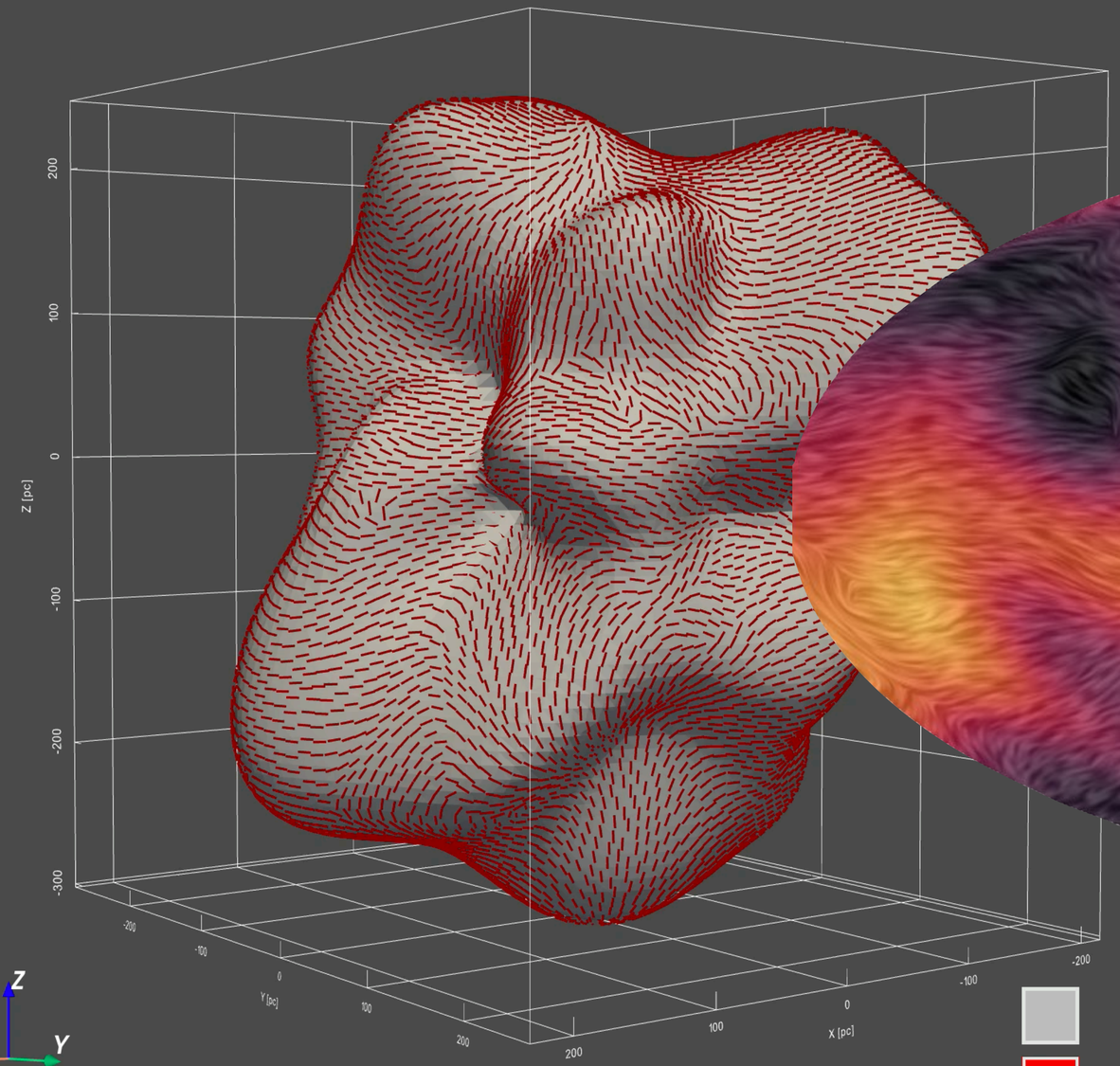
data + CARTOON + regions

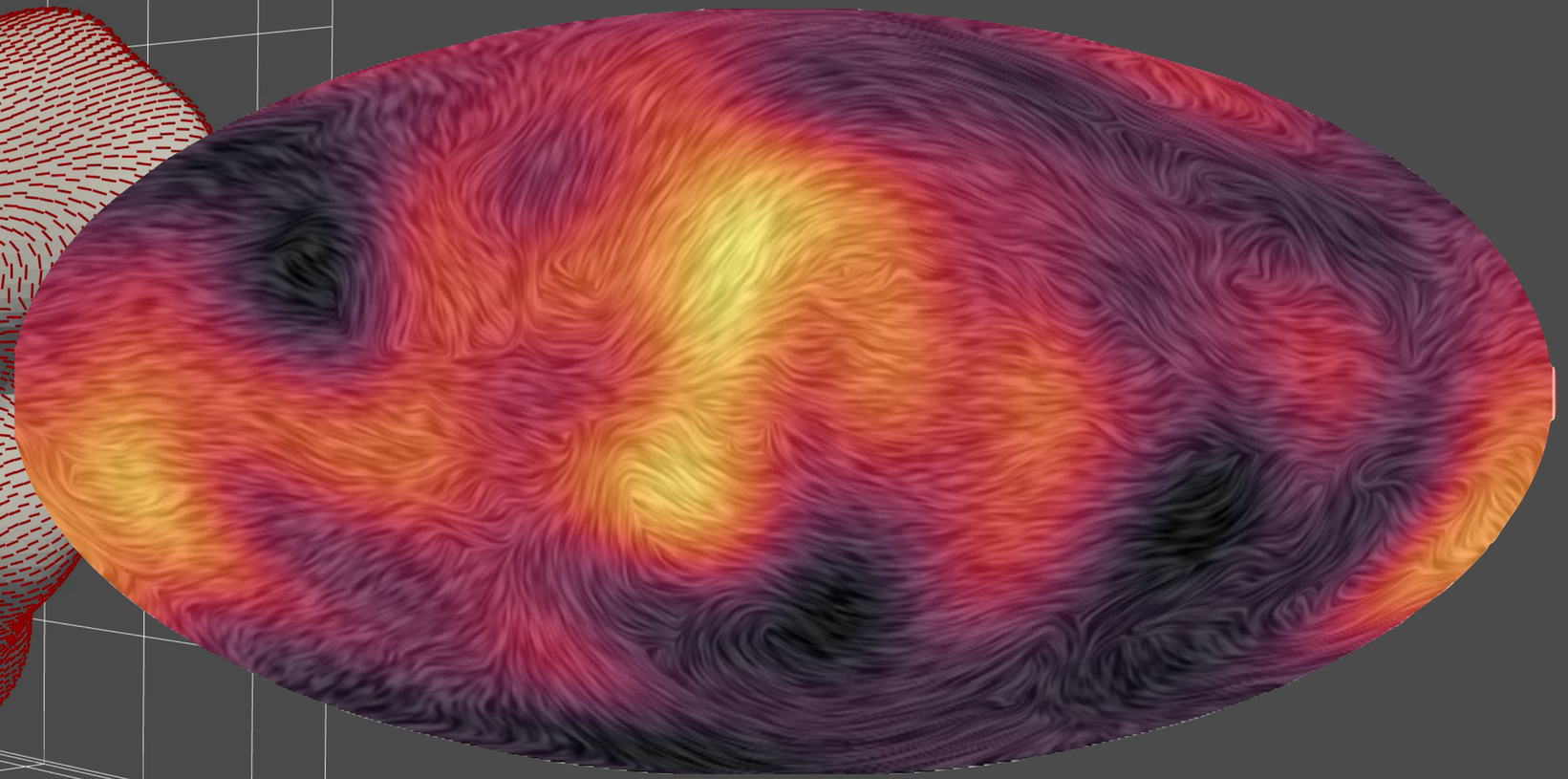


fully interactive attitude control



VISUALIZATION OPTIONS REVEAL DIFFERENT ASPECTS OF DATA, INFORMATION

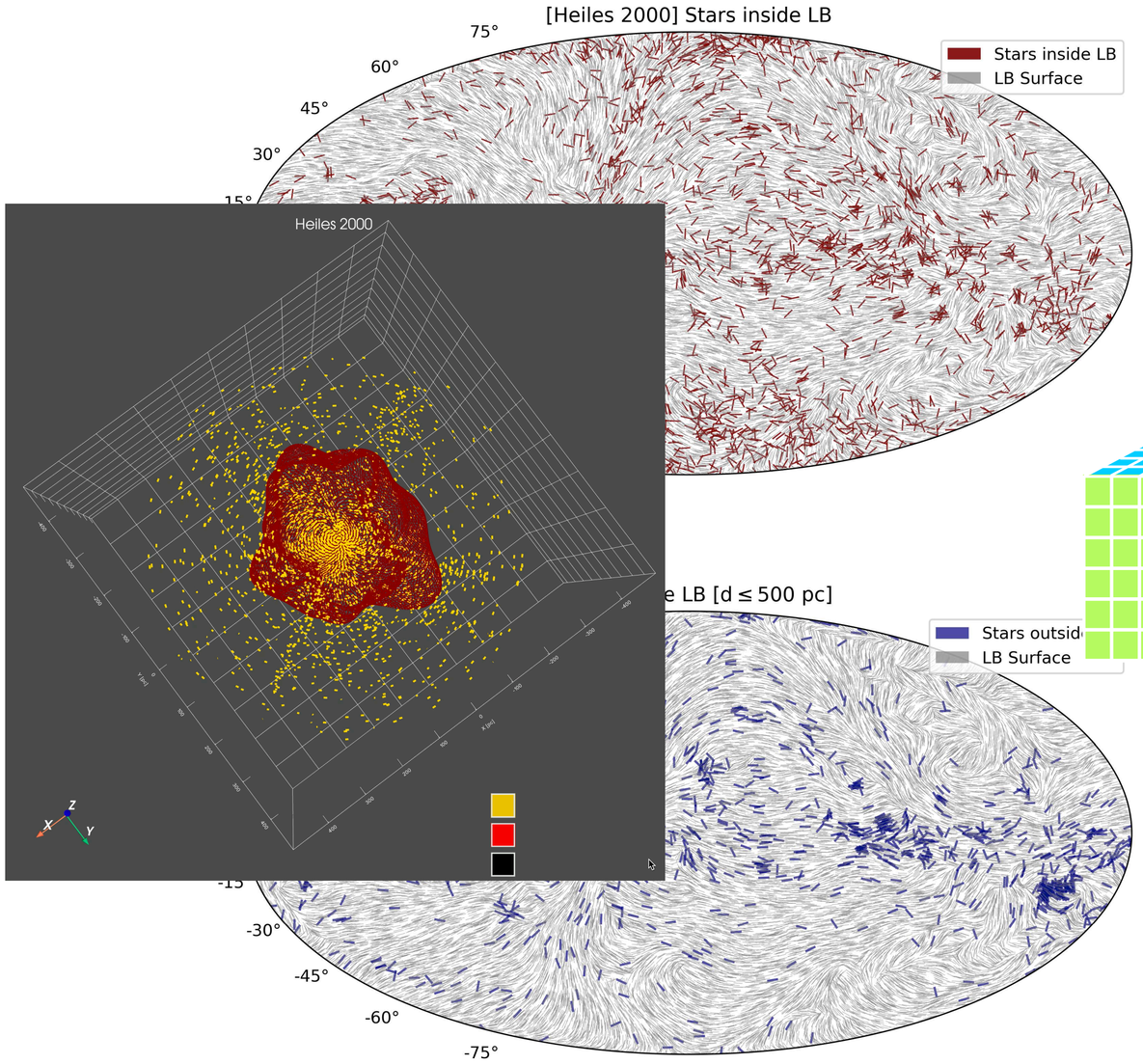


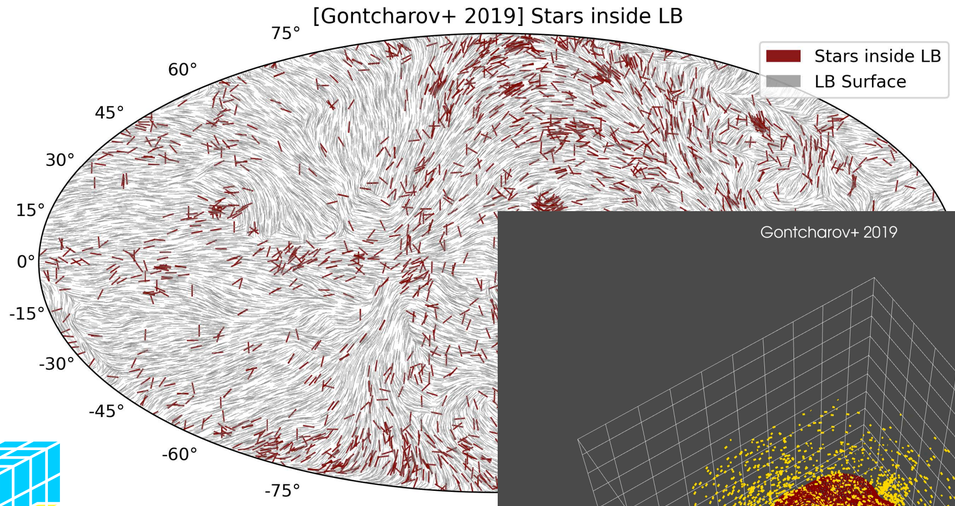


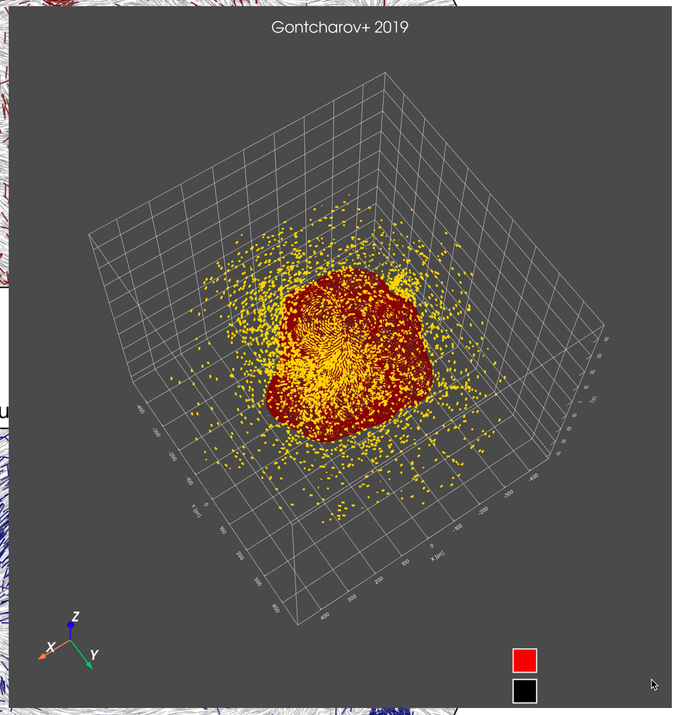
yes, this is the B-field on the surface of the Local Bubble from O'Neill et al. 2022, in process

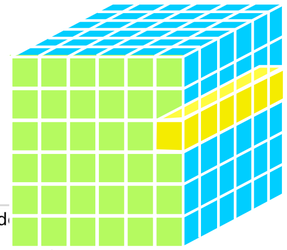
And, yes, Planck and distance-filtered background starlight polarimetry seem to agree

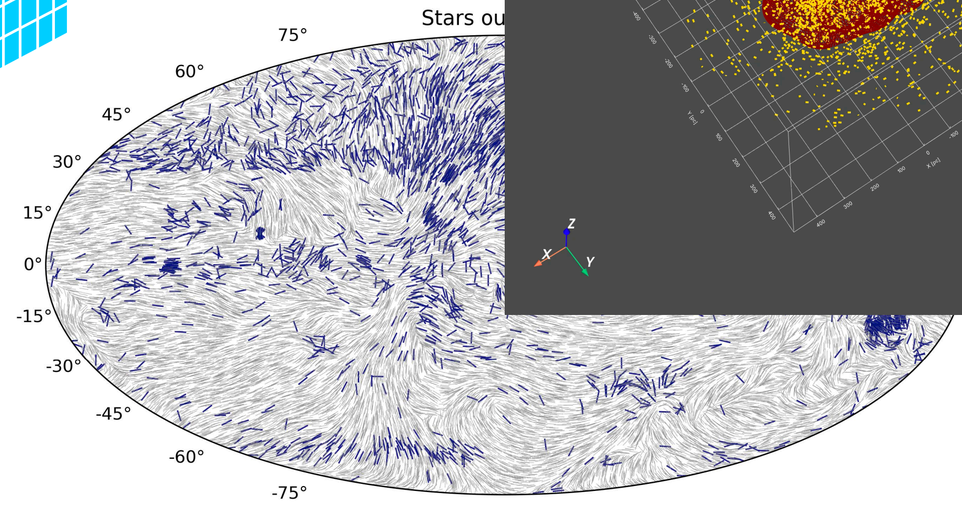
O'Neill et al. 2022, in process











DATA, INFORMATION

VISUALIZATION

(3D) data sets useful to a 3D map of the Milky Way near the Sun

File Edit View Insert Format Data Tools Extensions Help Accessibility

glue
multidimensional data exploration

OpenSpace

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Digital Universe

The Known Universe by AMNH

Watch on YouTube

SHOW TRANSCRIPT

Contribute 3D "nearby" Milky Way data here!

Please answer as many questions as you can in order for the community to have access to the data you share.

agoodman@cfa.harvard.edu (not shared) Switch account

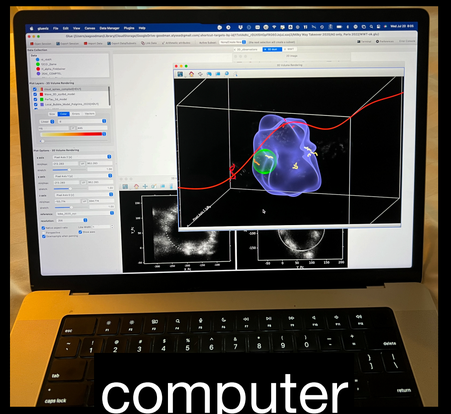
* Required

ShortIdentifier *

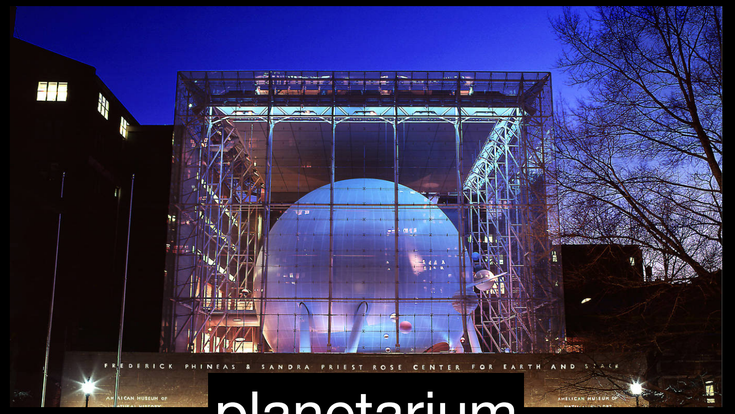
Your answer

Description of the data you are uploading (free text)

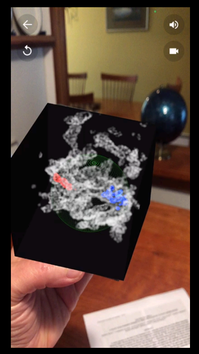
Your answer



computer



planetarium



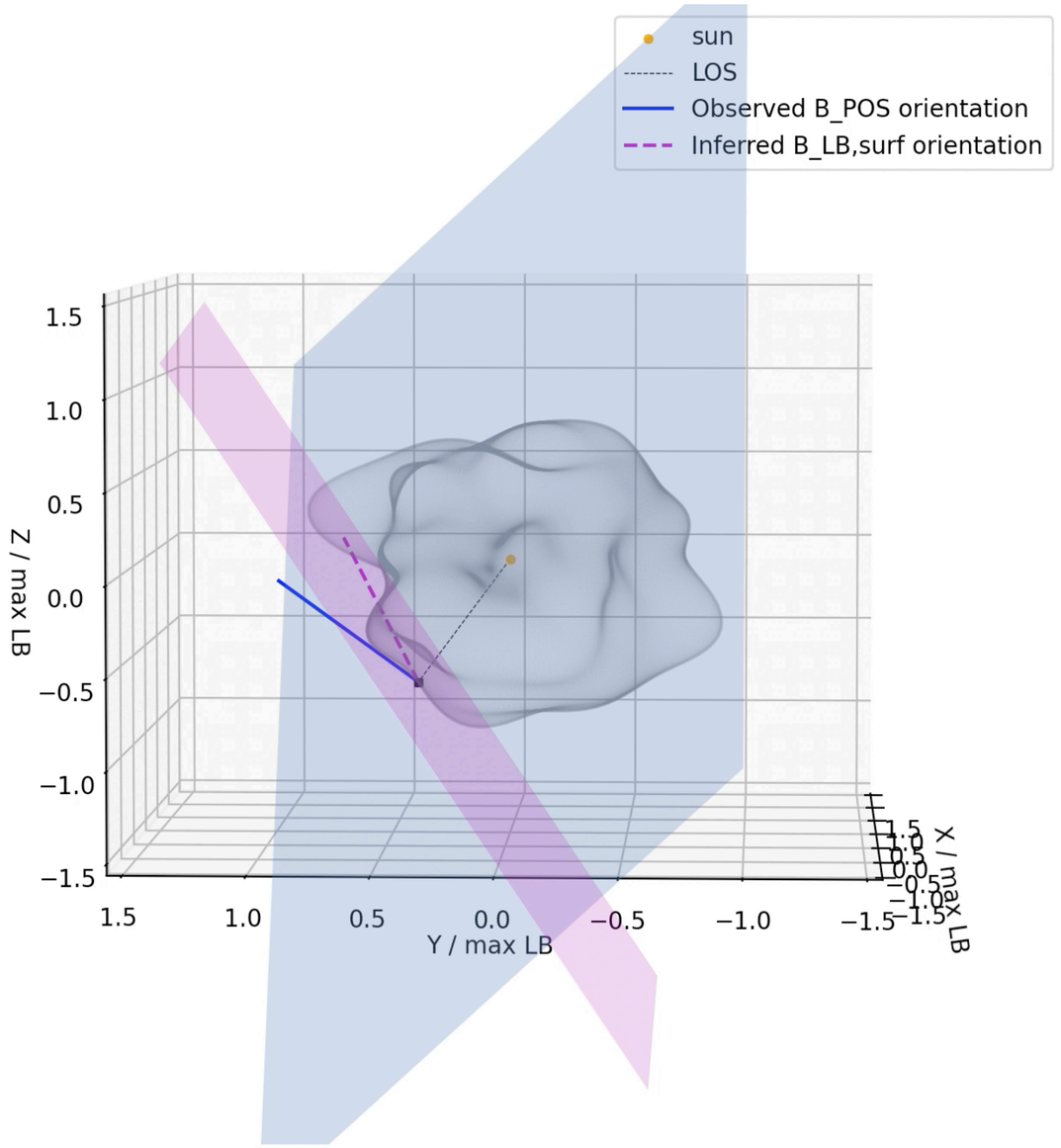
beyond…

The Local Milky Way, in 3D

DATA, INFORMATION

VISUALIZATION

NASA NSF GORDON AND BETTY MOORE FOUNDATION Alfred P. Sloan FOUNDATION HDSI Harvard Data Science Initiative Harvard Radcliffe Institute CENTER FOR ASTROPHYSICS HARVARD & SMITHSONIAN



O'Neill et al. 2022, in process