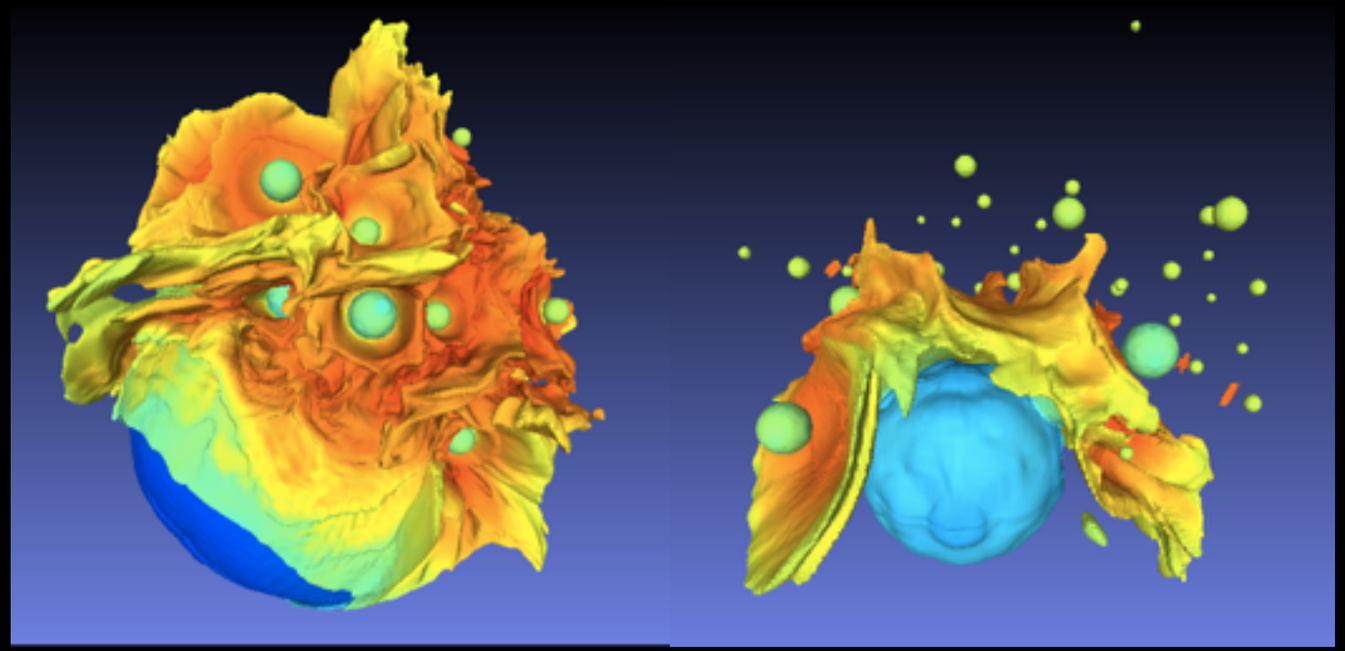
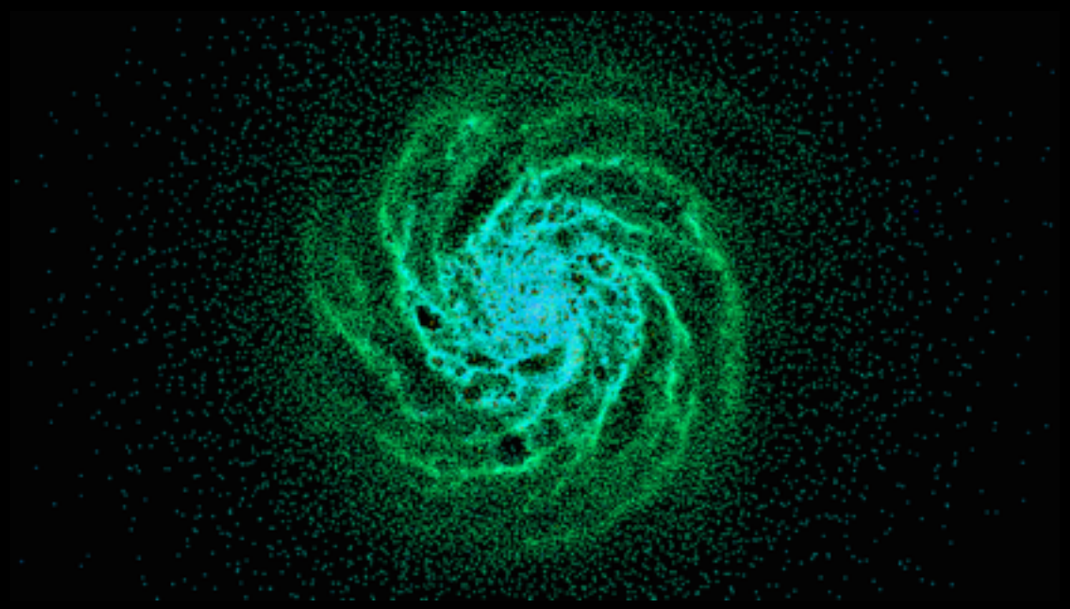
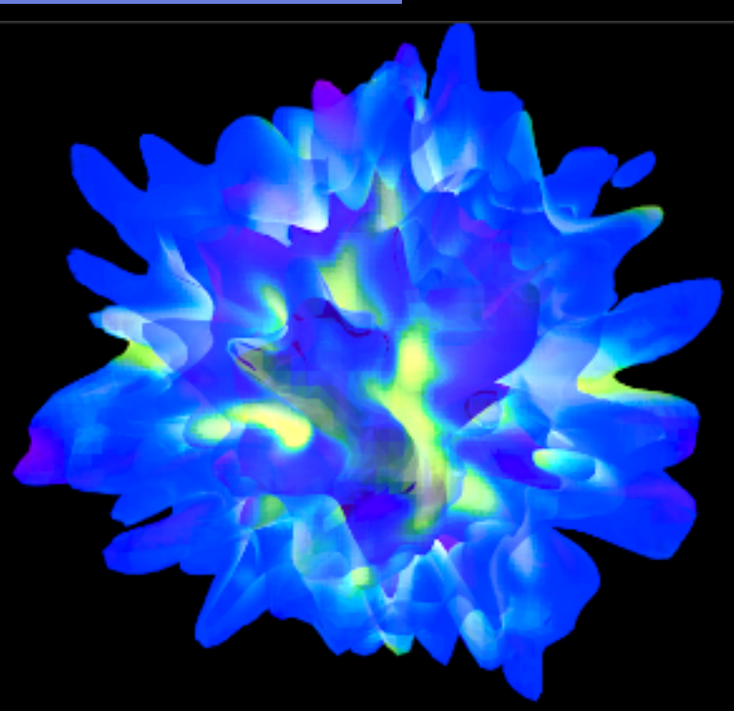
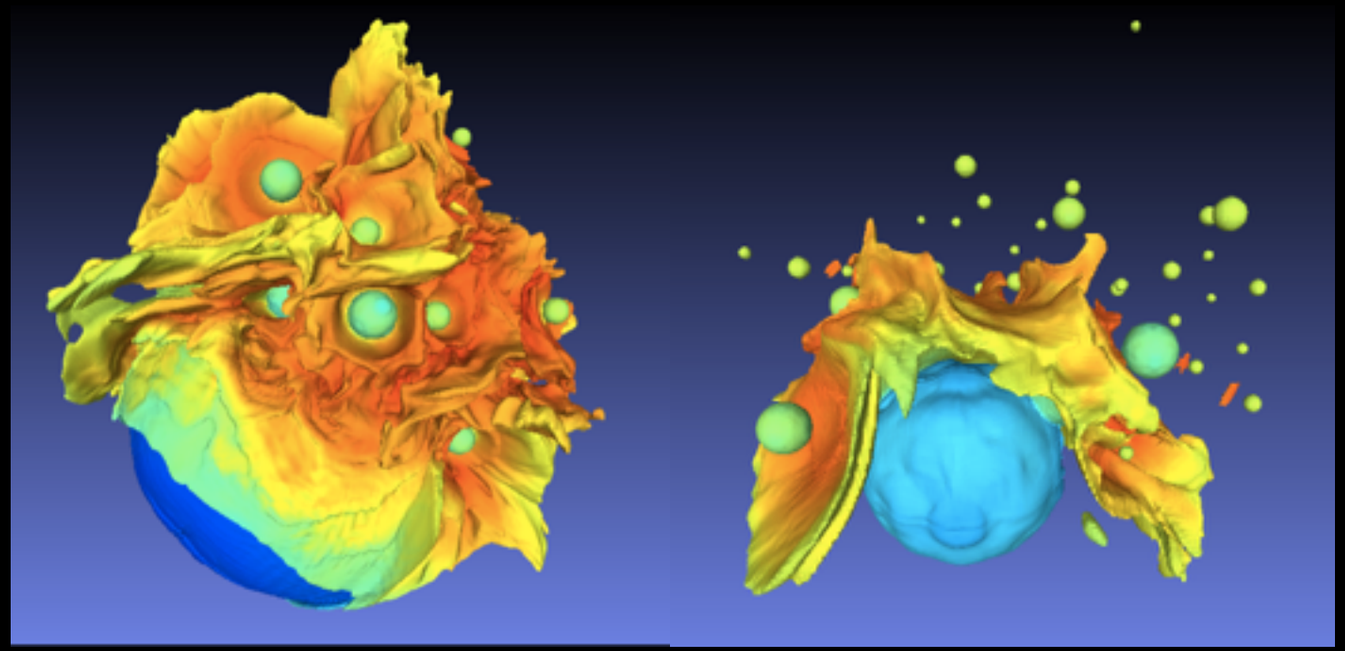
AstroBlend: An Astrophysical Visualization Tool



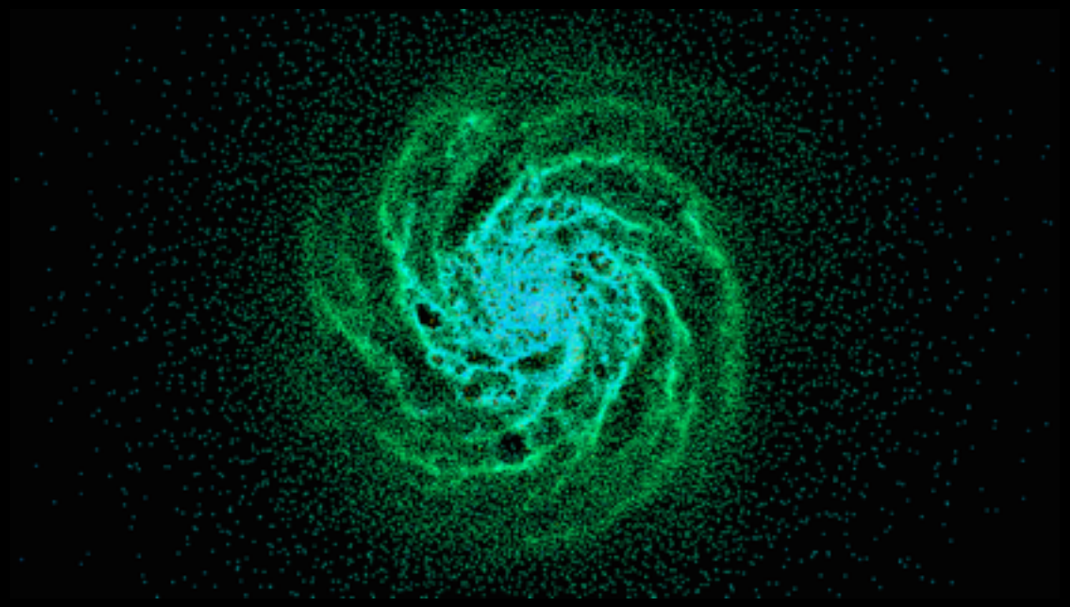




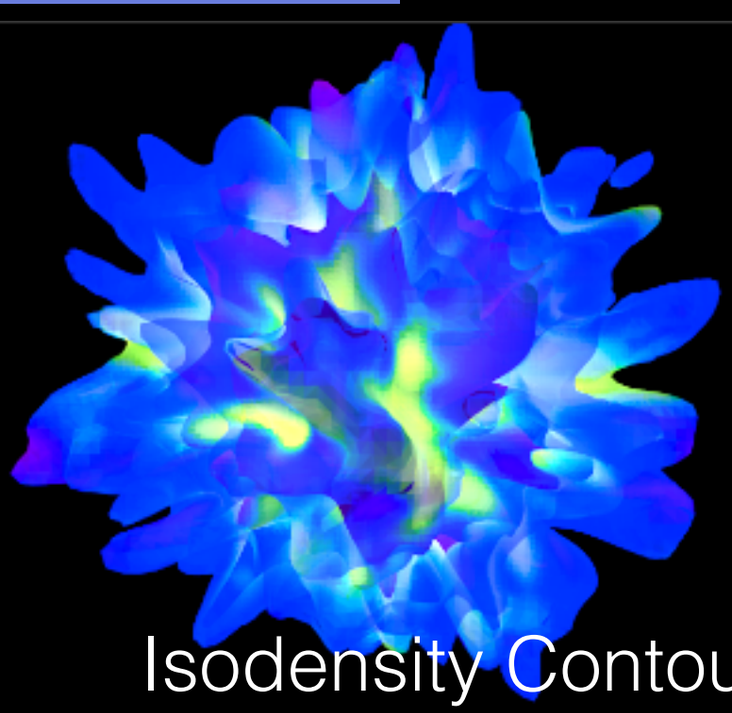
AstroBlend: An Astrophysical Visualization Tool



Isodensity Contours colored by temperature



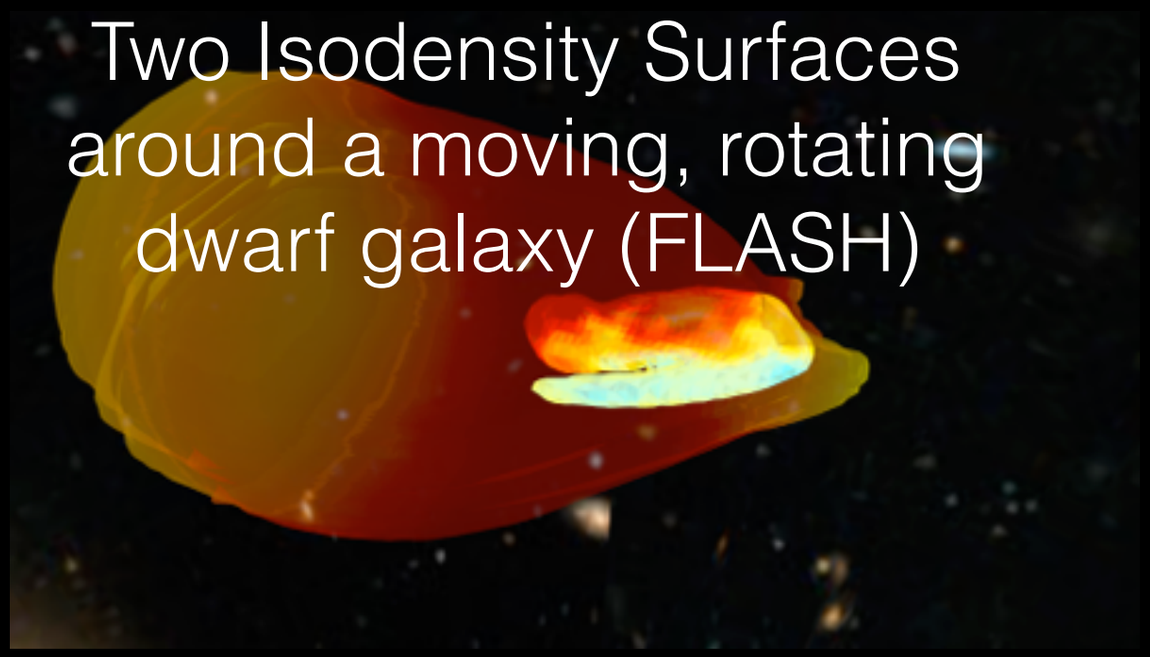
Galaxy particle simulation (colors = temperature)

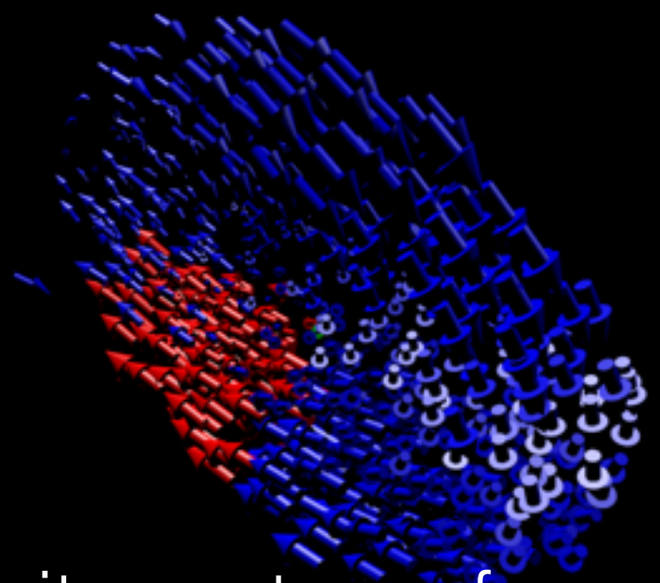


Isodensity Contours colored by temperature, glowing based on physics

AstroBlend

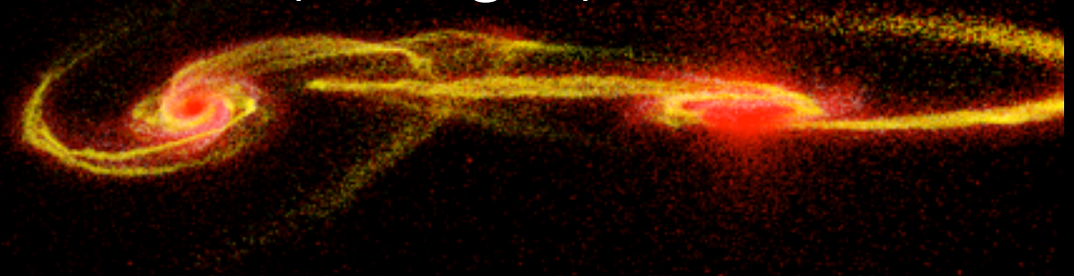
Two Isodensity Surfaces around a moving, rotating dwarf galaxy (FLASH)

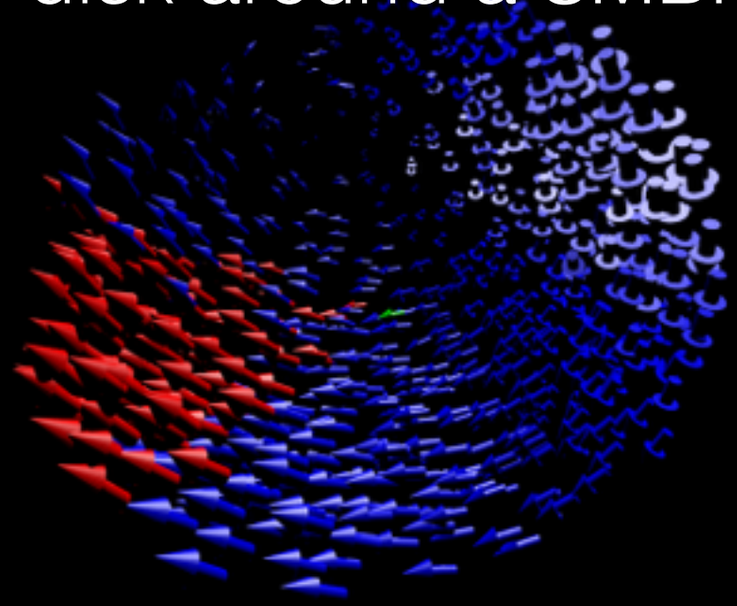




Velocity vectors of gas in a disk around a SMBH

SPH galaxies merging (Gadget)





Blender

- 3D modeling and animating program (free Maya/Houdini)
- used by 3D graphics folks and a few astronomers

Blender

Features

- Open source (free!)
- python scripting
- being used by more and more astronomers
- can combine data from multiple simulations
- easy to script complex camera motions
- AMR (surfaces) & SPH (particle clouds) data supported
- direct access to data with yt

Blender

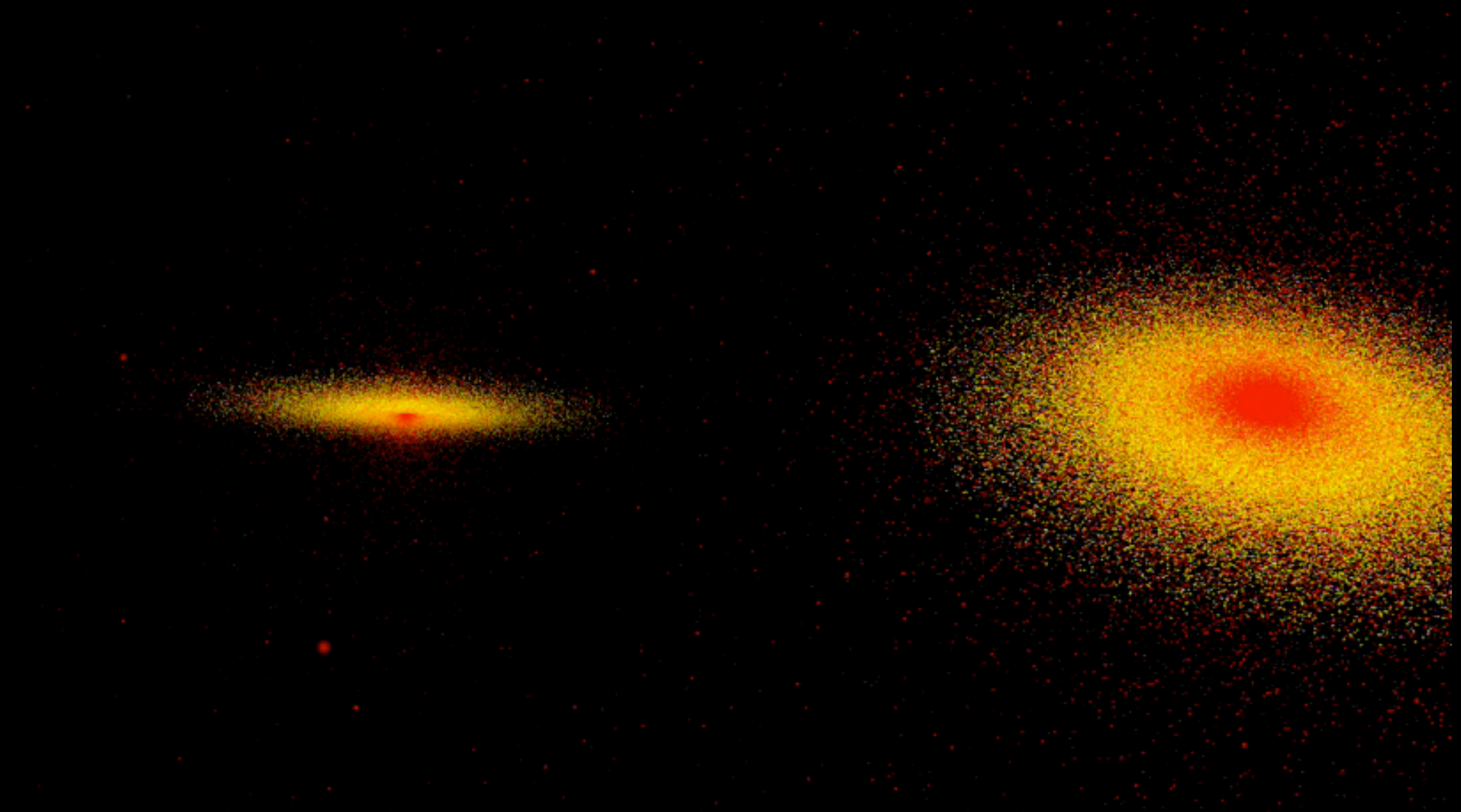
Current Code Support

Below is a summary of the level of support for each type of hydrodynamical code:

AstroBlend support for codes is an ongoing process, please find your code below to see if its supported.

Code/Format	yt Surface Support	AstroBlend Surface Support	SPH Support
FLASH	Y	Y	NA
Enzo	Y	Y	NA
Athena	Y	Y	NA
Artio	N	NA - just loads	NA
Fits	N	NA - just loads	NA
GDF	N	NA - just loads	NA
MOAB	N	NA - partial loading	NA
SPH Text Files	N	N	Yes (see here)
Tipsy	N	N	Y

AstroBlend: Gratuitous Movies!



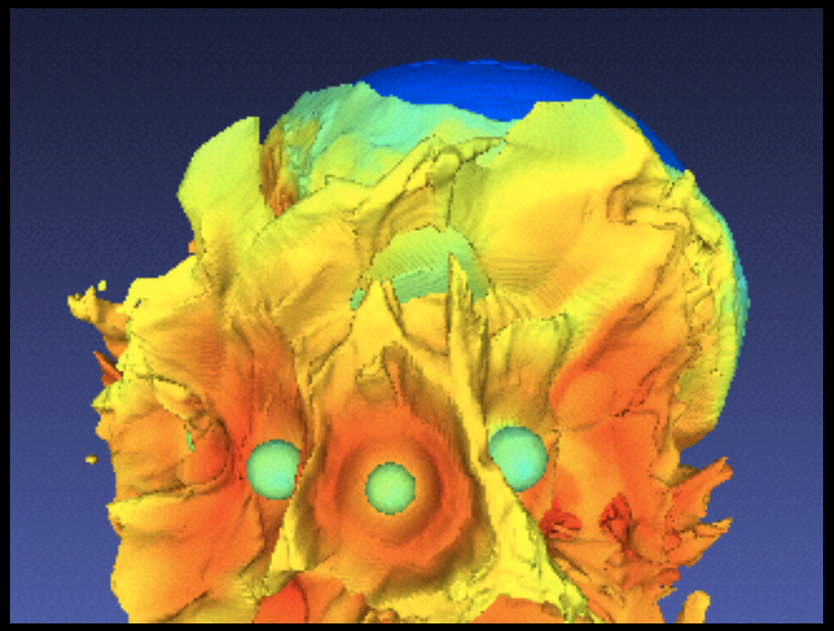
~4.6 billion particles

AstroBlend: Gratuitous Movies!

Made (nearly) entirely with Python in Blender

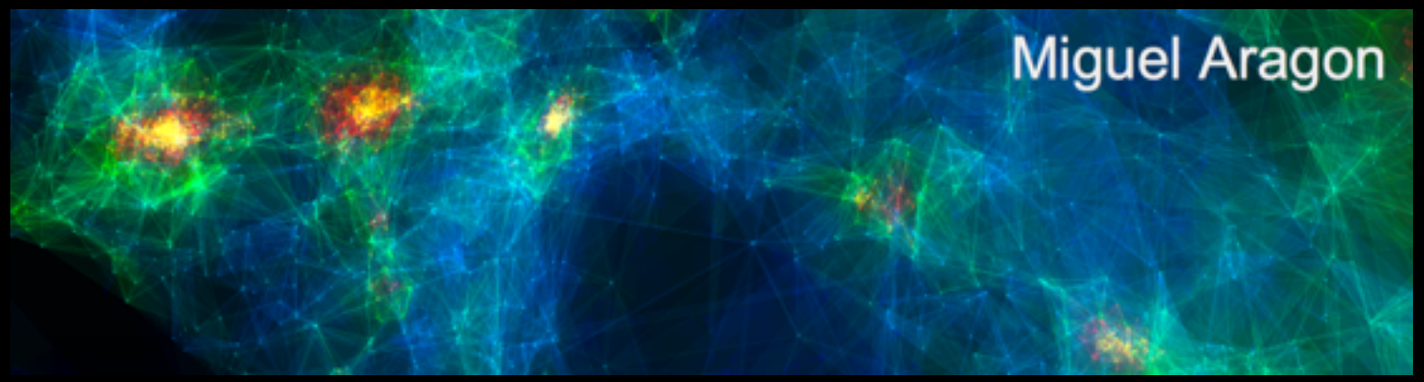
What else can I make?

- Cool things to print!



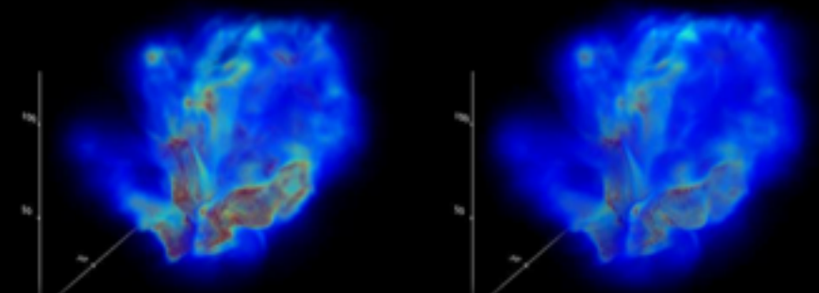
www.astroblend.com

Other Astrophysicists working in Blender:



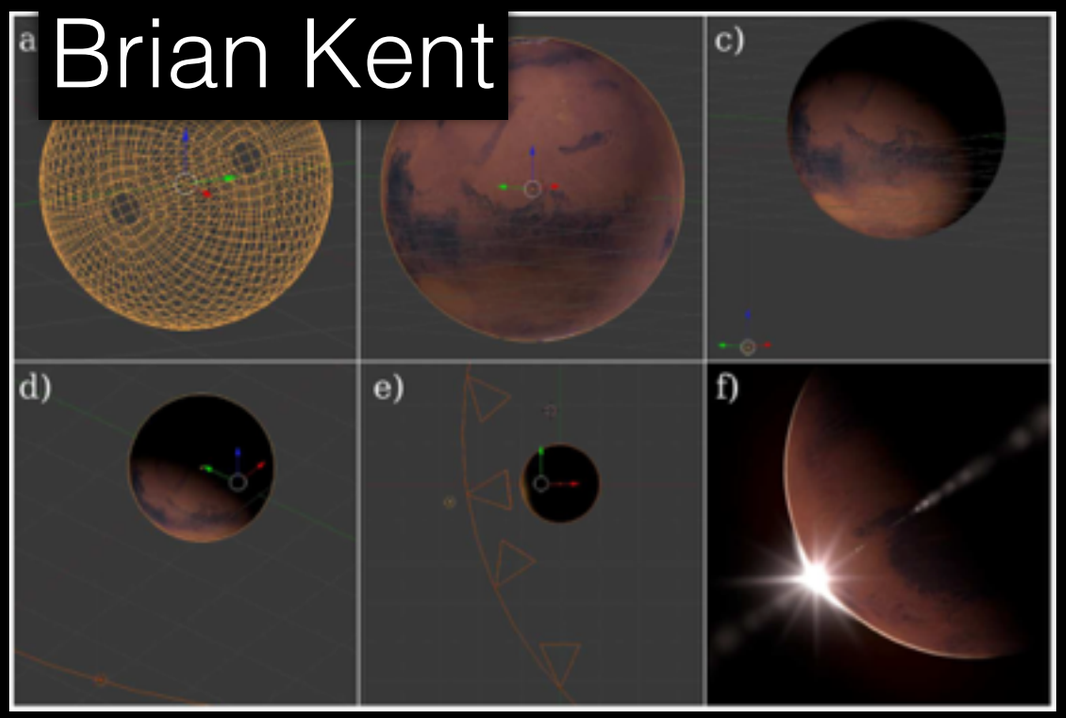
http://skysrv.pha.jhu.edu/~miguel/visualization.html

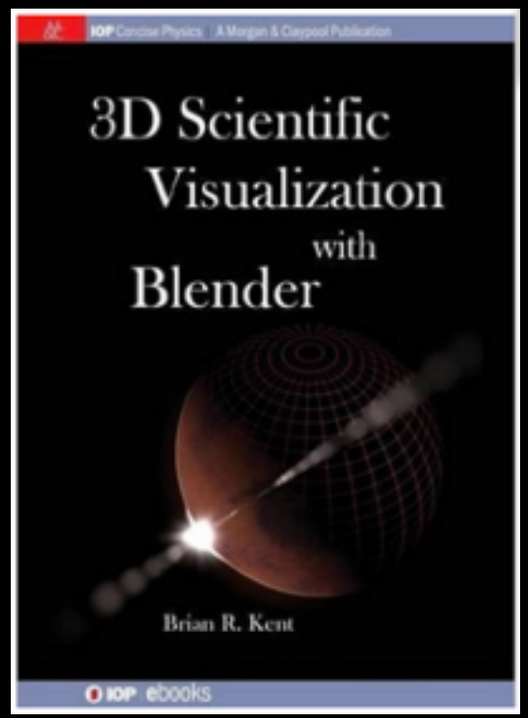
Rhysy Taylor



FRELLED - volume rendering
http://www.rhysy.net/frelled.html

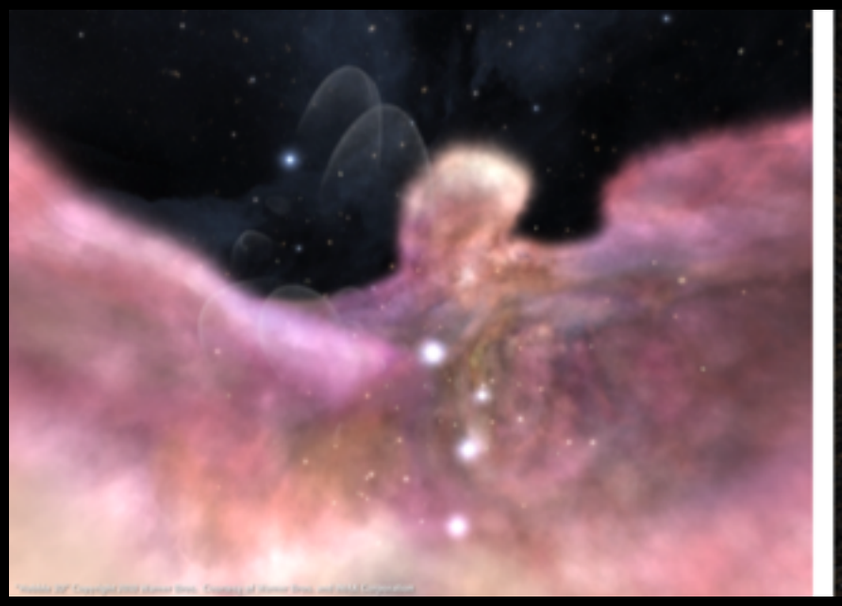
Brian Kent

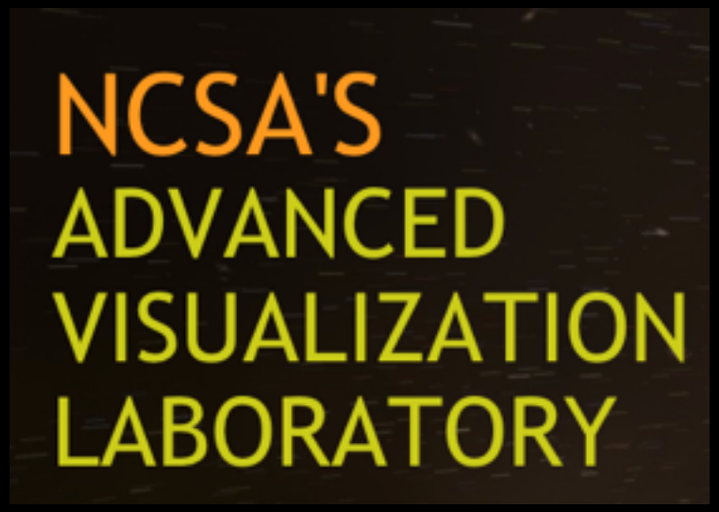


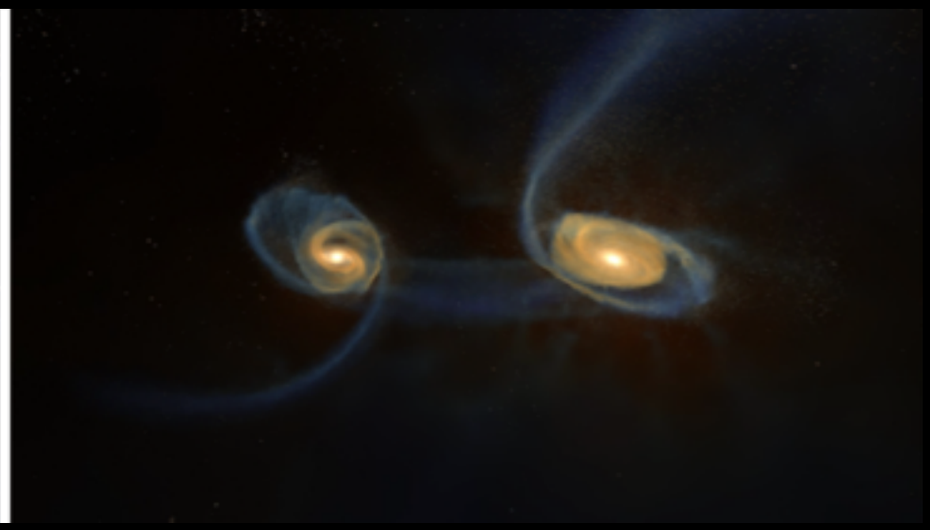


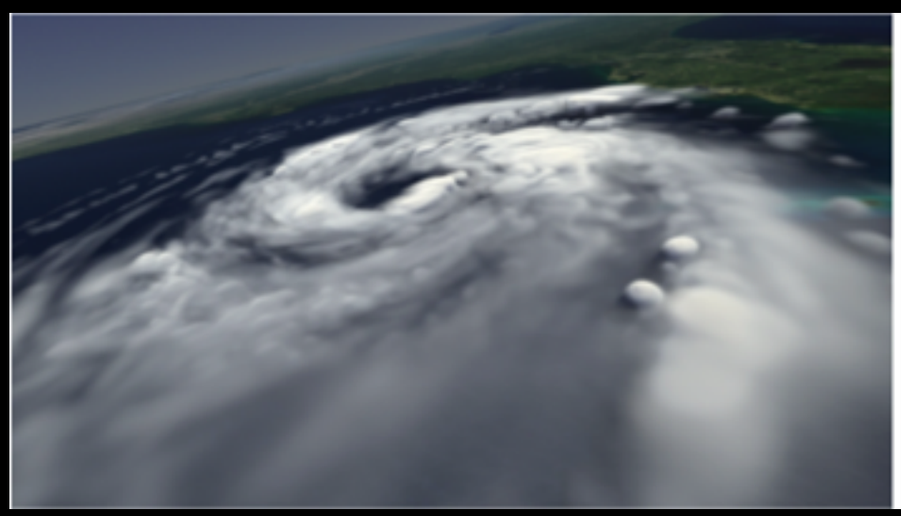
http://www.cv.nrao.edu/~bkent/blender/index.html

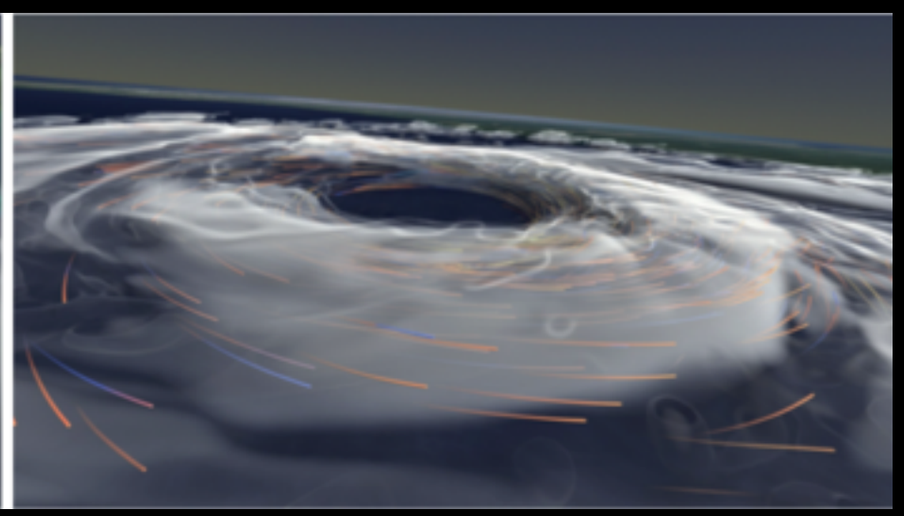
Beginning to work in Houdini





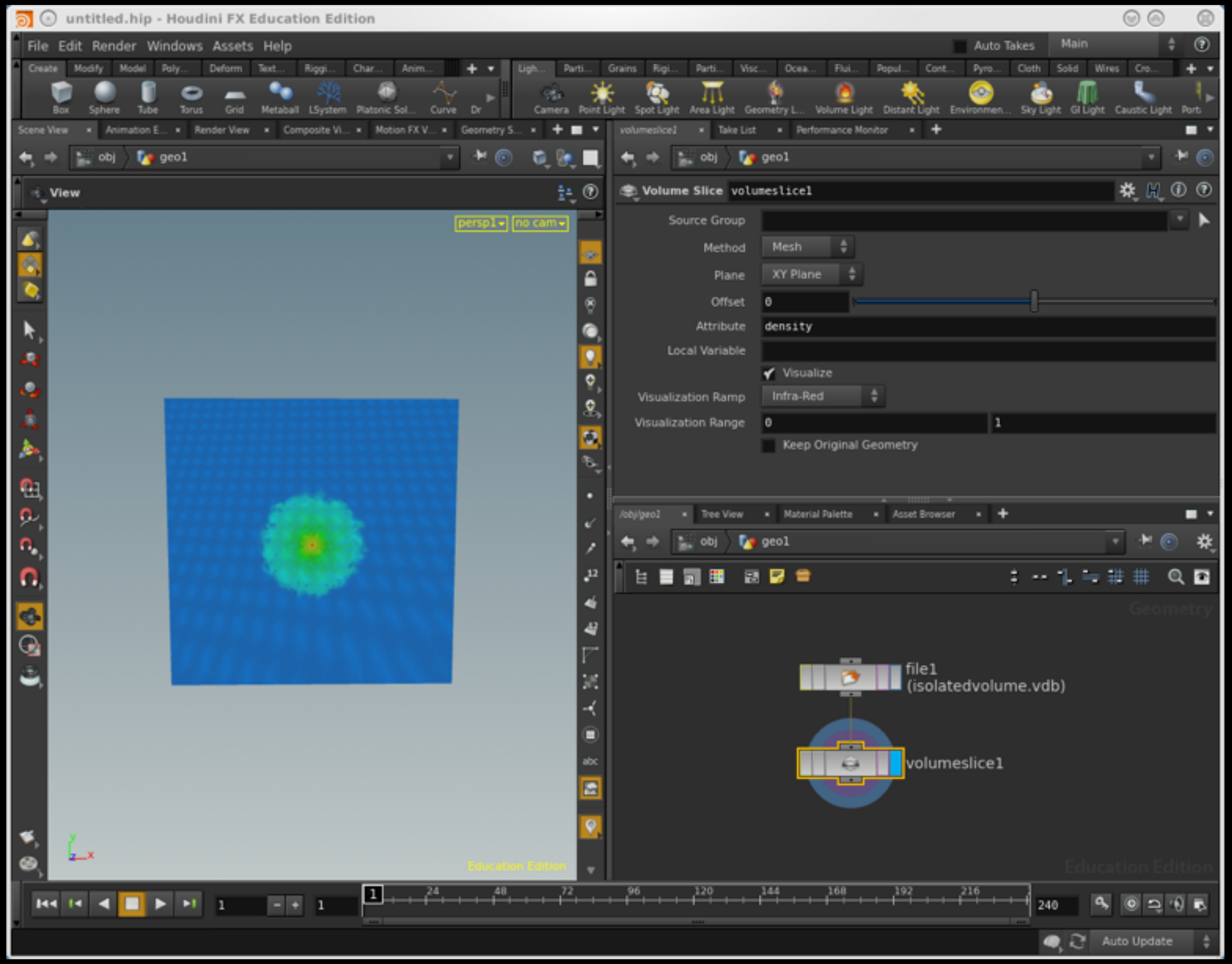






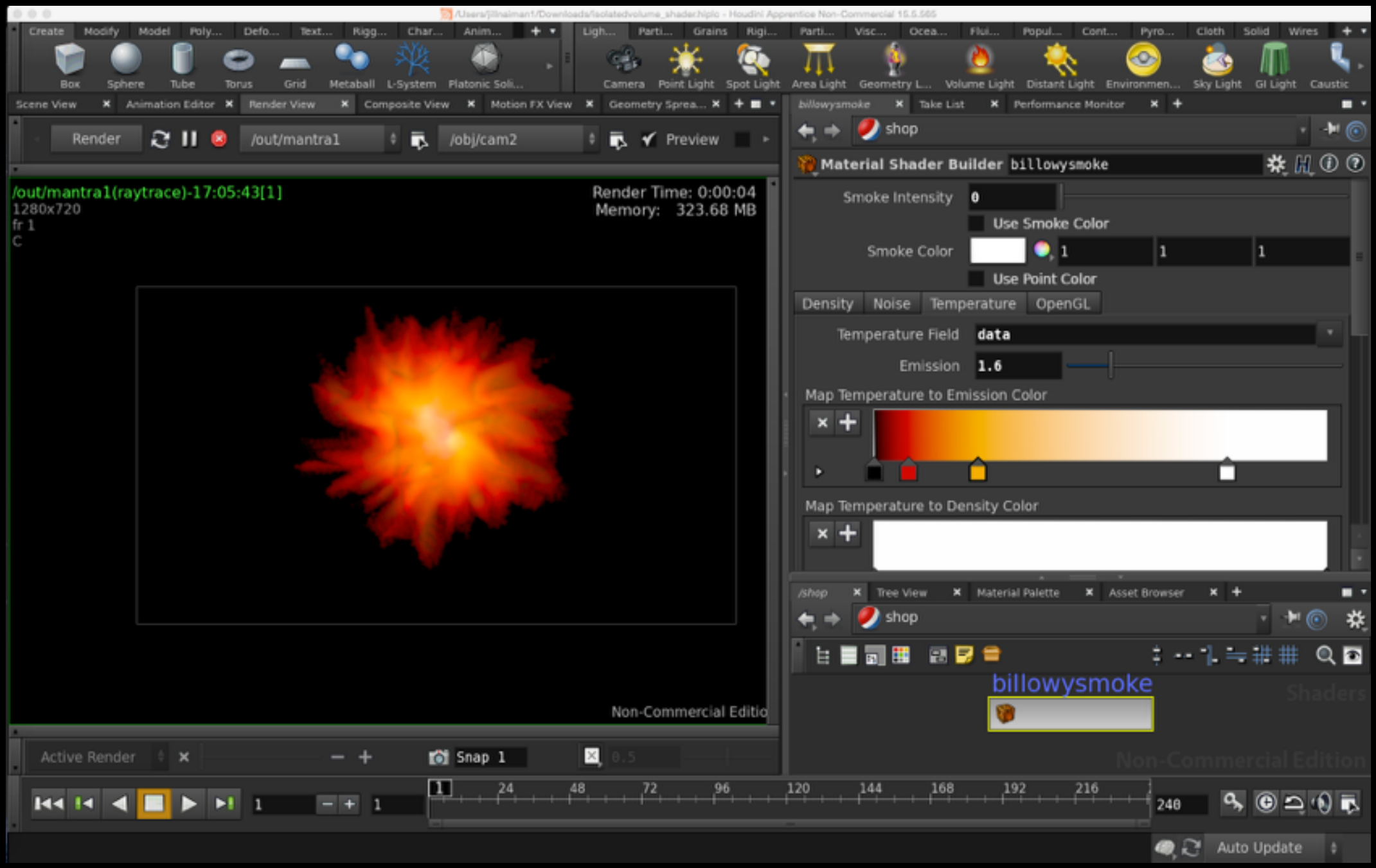
Beginning to work in Houdini

Beginning to work in Houdini



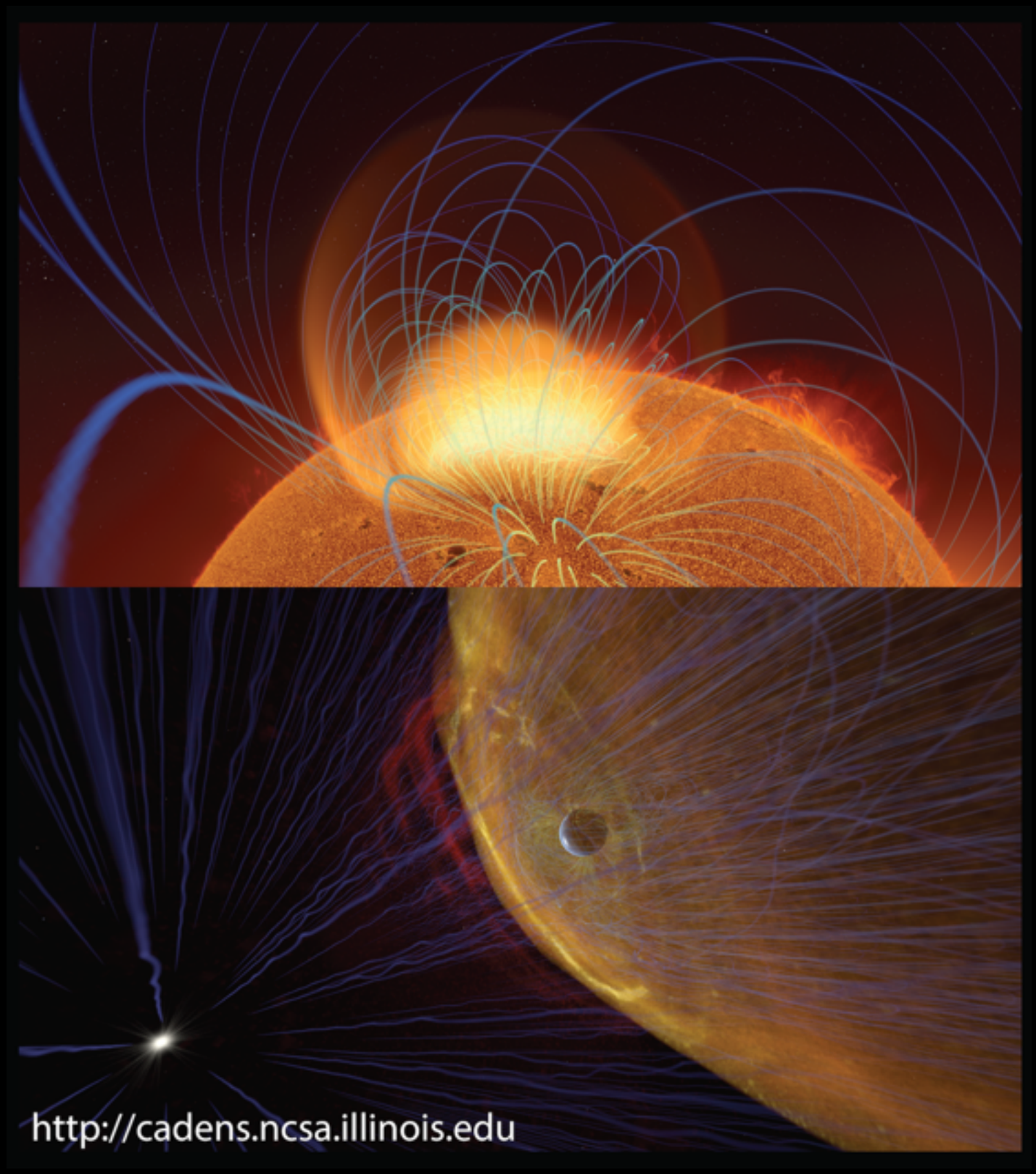
yt as a data loader

Beginning to work in Houdini



yt as a data loader

Beginning to work in Houdini



Beginning to work in Houdini: Some Fixes

- More efficient data storage (VDB)
- Messing with how edges of volume rendering boxes are treated (box filter width, custom shaders)
- Data loading based on camera position (on the fly data processing during render, yt as a shader)

Beginning to work in Houdini: Some Fixes

Can load & process high resolution data more efficiently…
but there is still so much data not shown!

www.ytini.com

http://meshlab.sourceforge.net/

jill.naiman@cfa.harvard.edu

- www.astroblend.com
- http://www.ncsa.illinois.edu/
- www.sketchfab.com/jnaiman
- www.ytini.com

Some final thoughts on increasing access to science

Moved on to:

3D Planets https://skfb.ly/RyZo

3D Galaxies https://skfb.ly/QHwx