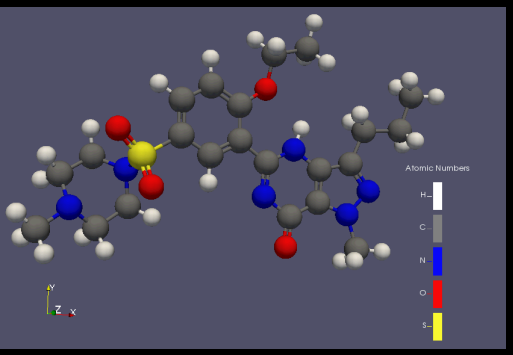
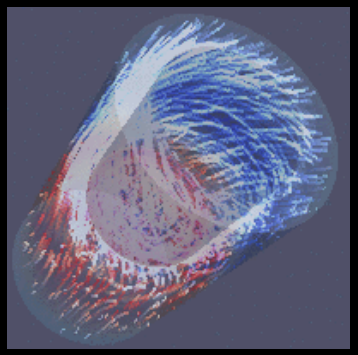
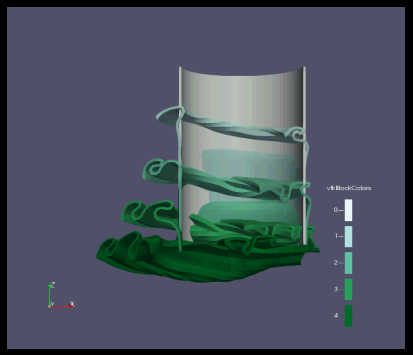
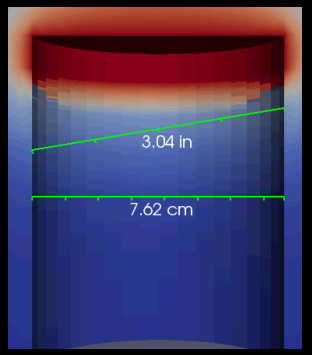
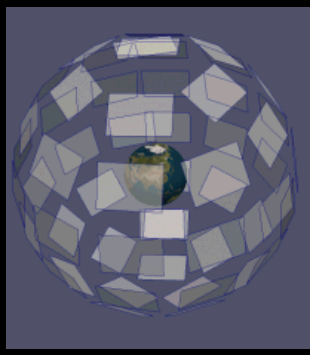
SAND2017-4311PE





What's New in ParaView

DOECGF 2017

May 2, 2017

Kenneth Moreland Sandia National Laboratories

CCR Center for Computing Research

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Acknowledgements

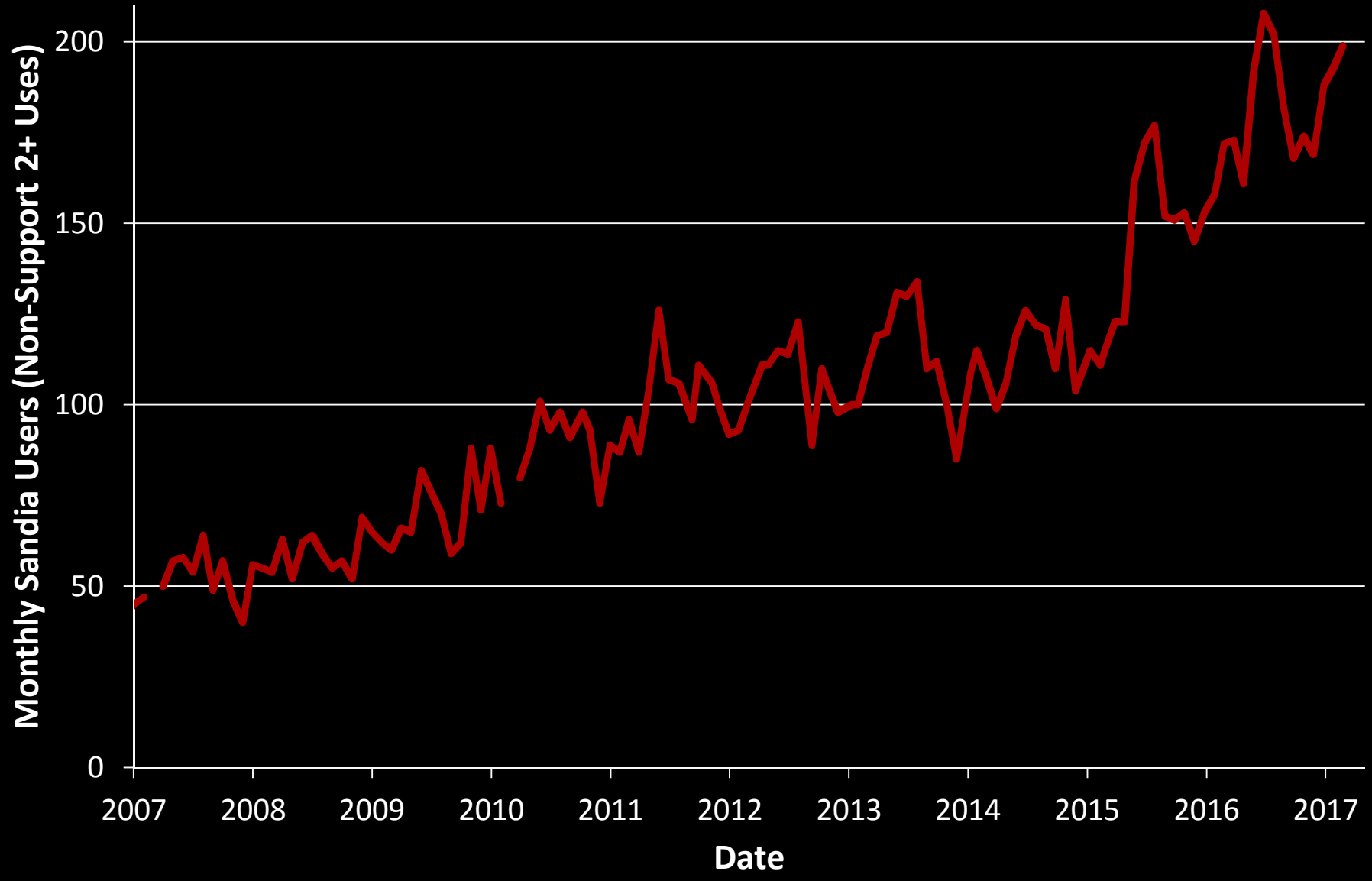
- This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Advanced Scientific Computing Research, under Award Numbers 10-014707, 12-015215, and 14-017566.
- This research was supported by the Exascale Computing Project (17-SC-20-SC), a collaborative effort of two U.S. Department of Energy organizations (Office of Science and the National Nuclear Security Administration) responsible for the planning and preparation of a capable exascale ecosystem, including software, applications, hardware, advanced system engineering, and early testbed platforms, in support of the nation's exascale computing imperative.
- Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA-0003525.

The Numbers

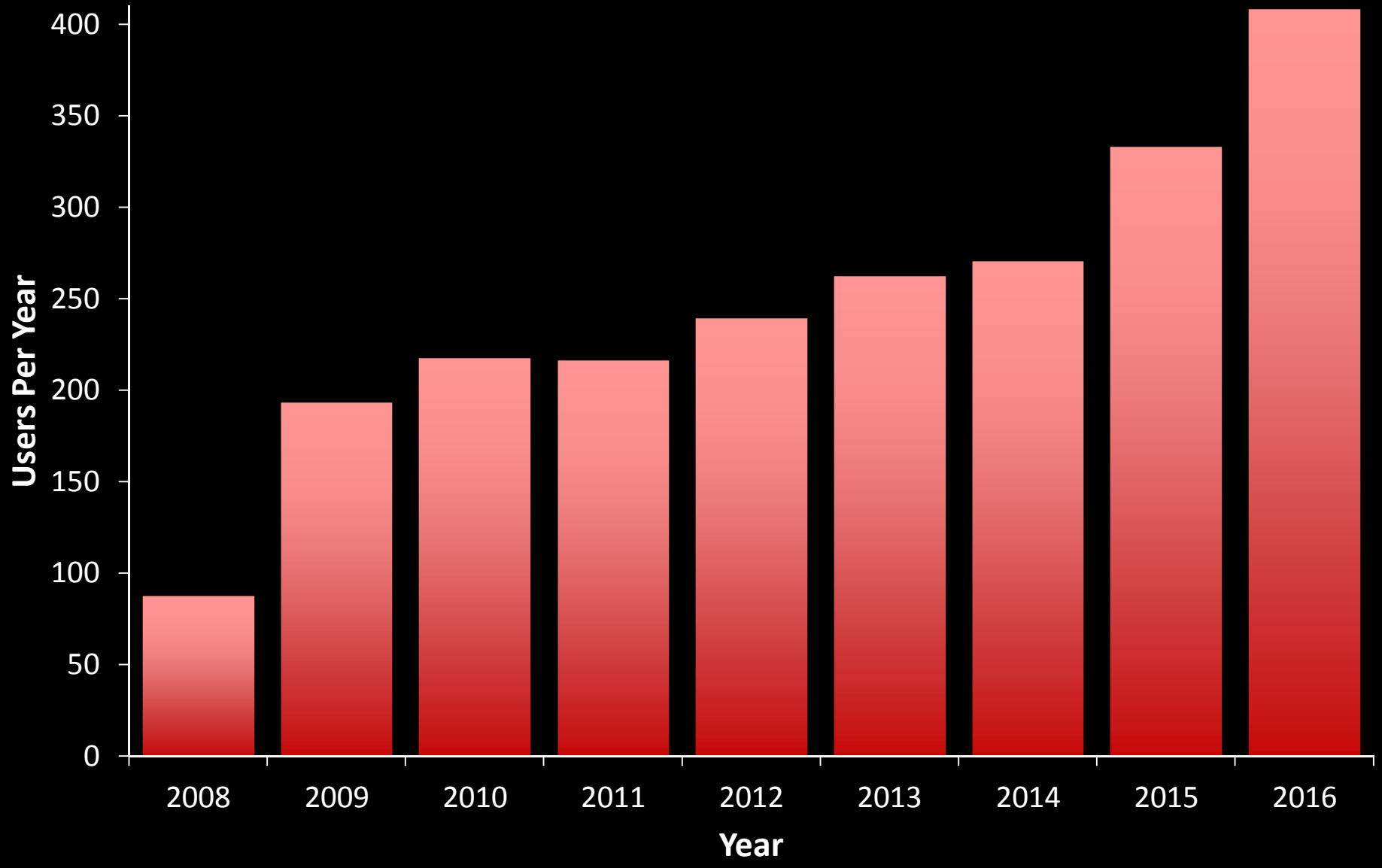
Sandia National Laboratories

- Releases during the last 12 months: 5.1.0 (June 2016), 5.1.2 (July 2016, 5.2 (November 2016), 5.3 (March 2017)
- SC 2016 Tutorial
- Users at Sandia
  - ~185/month (DART metric: 2+ uses, non-support)
  - 408 total during 2015 (unclassified use only)
- Downloads from Kitware past year: > 135K
  - Counts button clicks on web form
  - Duplicate IP's removed
  - Includes binary and source packages. Not data nor plugins
- About 2.9K emails exchanged on mailing list in 2016

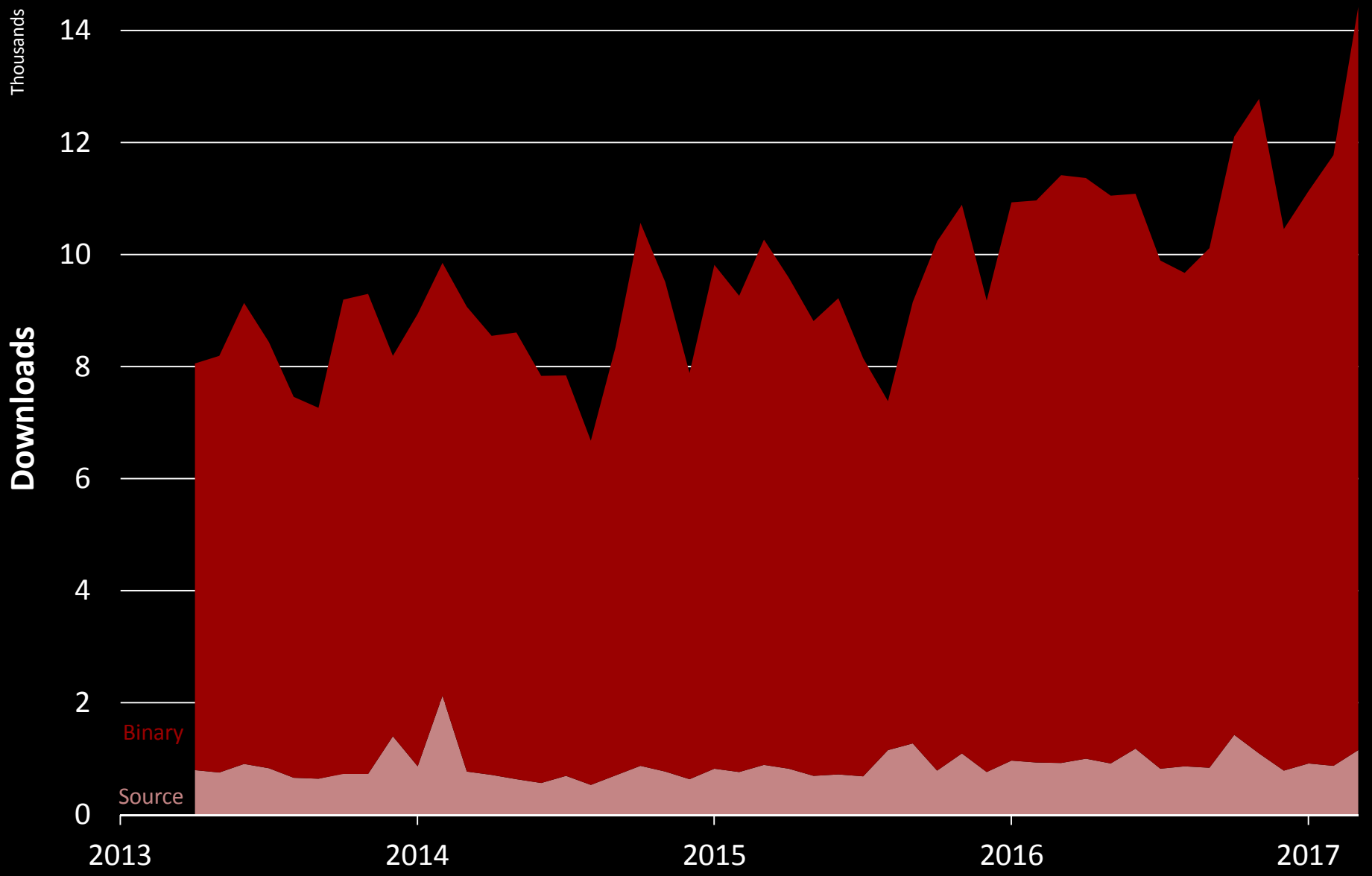
Sandia Monthly ParaView Usage



Sandia Yearly ParaView Usage

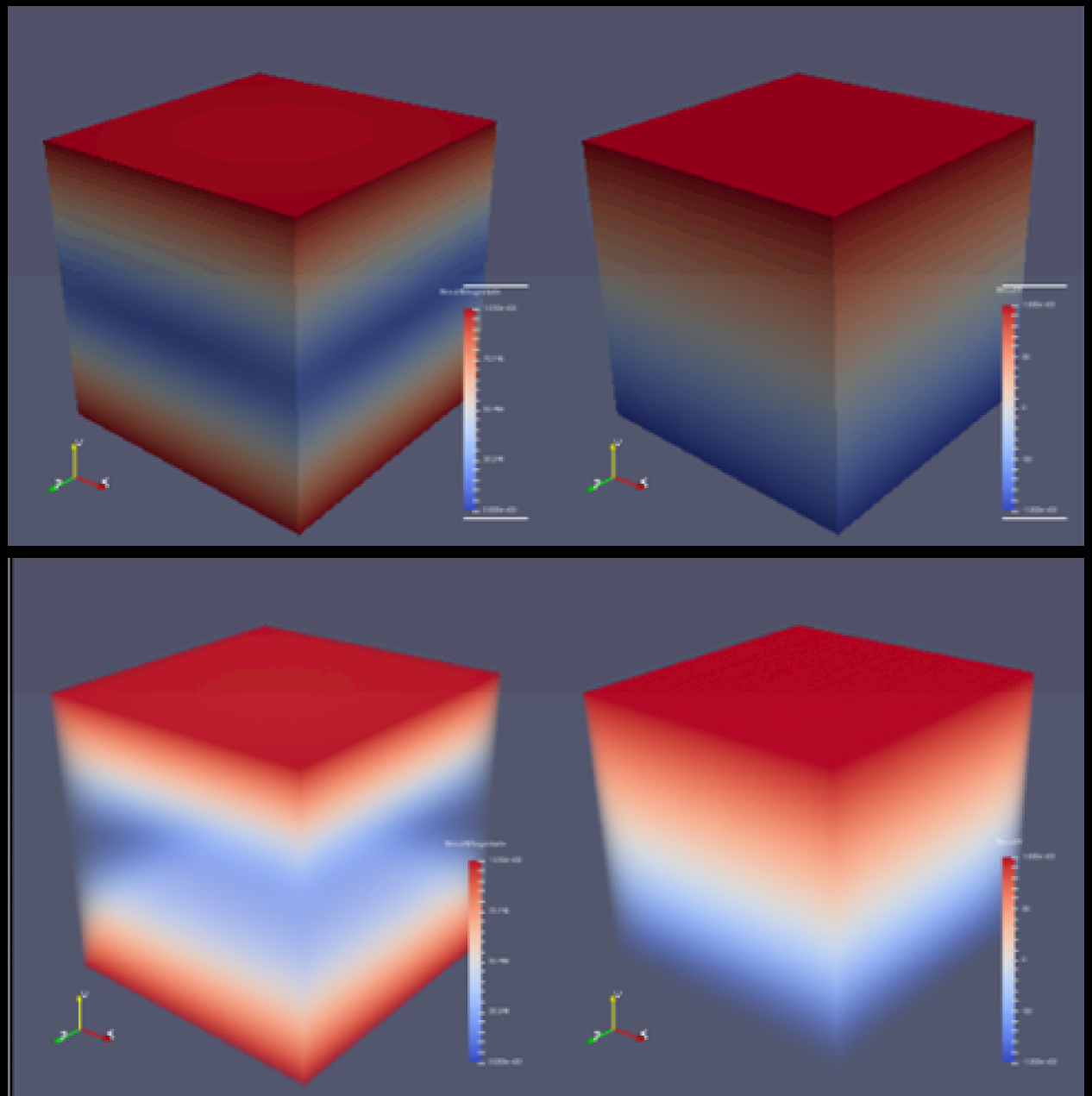


Kitware ParaView Downloads



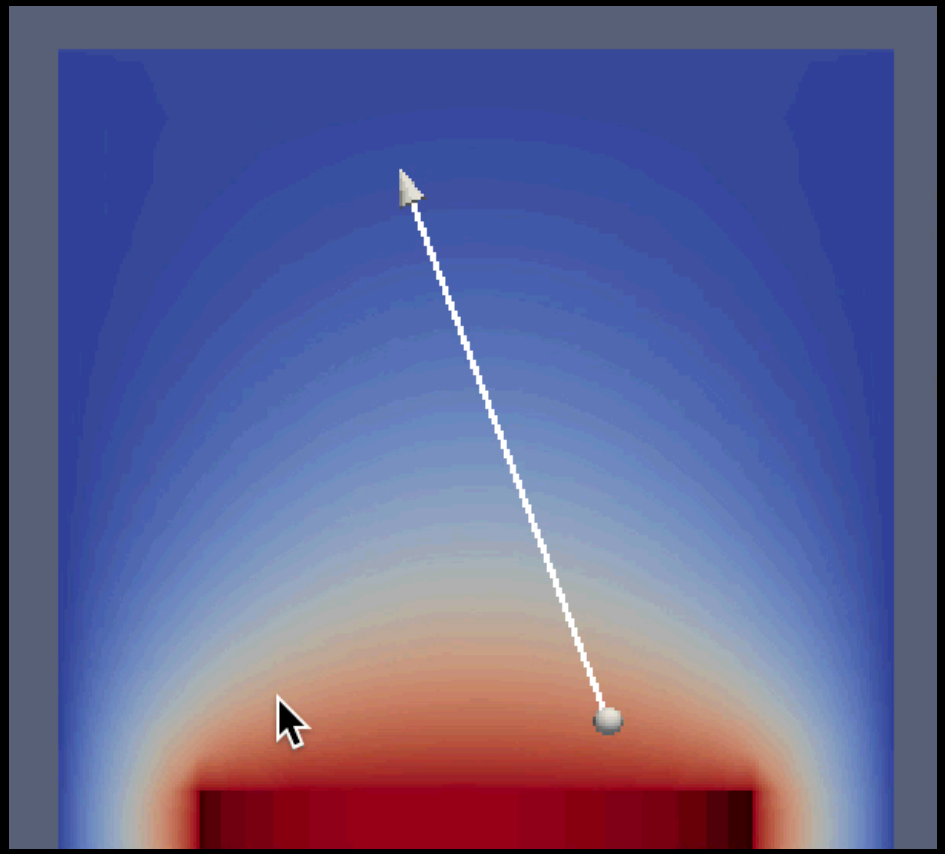
User Interface Improvements

Volume Render by Vector



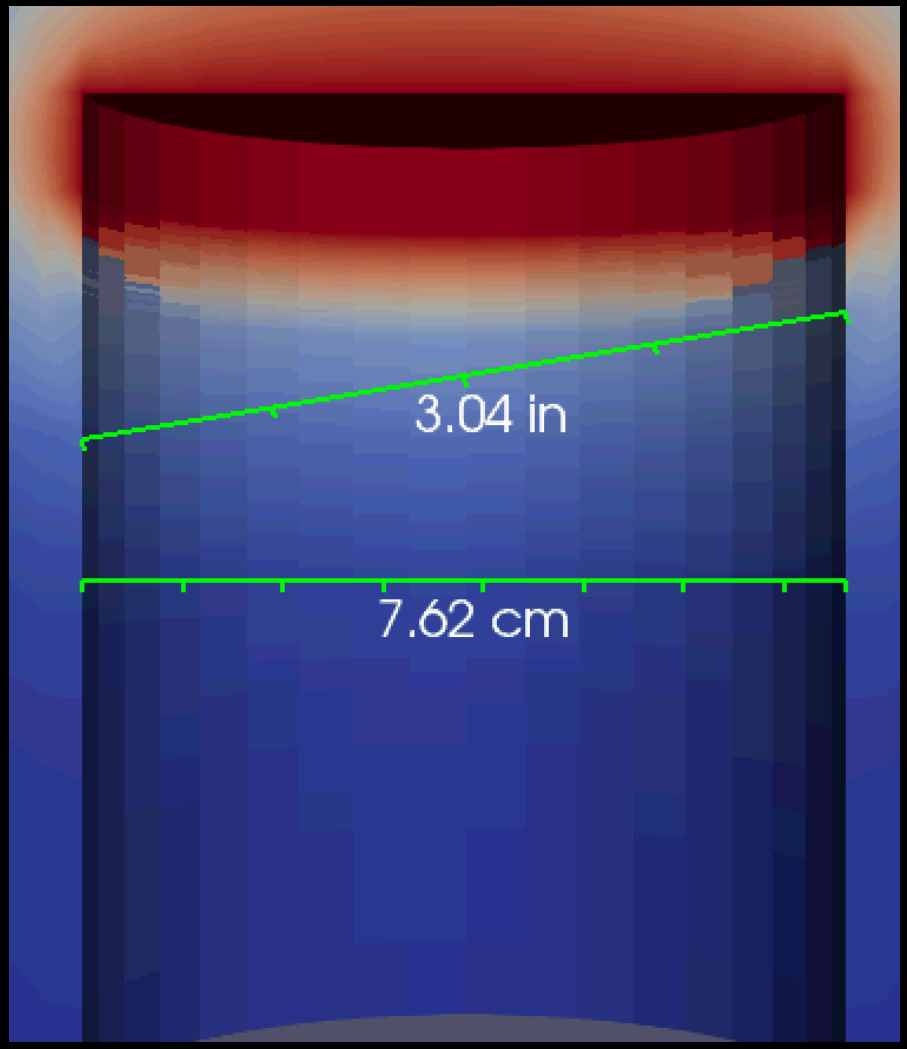
Improved Line Widget

- P to alternate pick points (as before)
- 1 to pick first point
- 2 to pick second point
- Use ctrl to snap to closest mesh point
- Hold x, y, or z to constrain to that axis

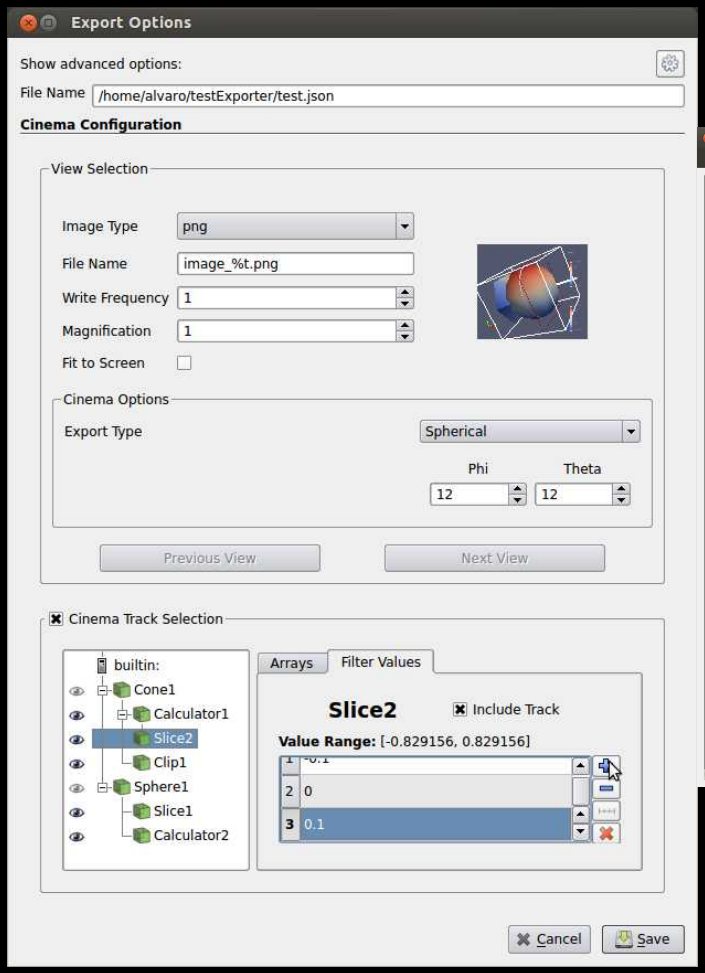


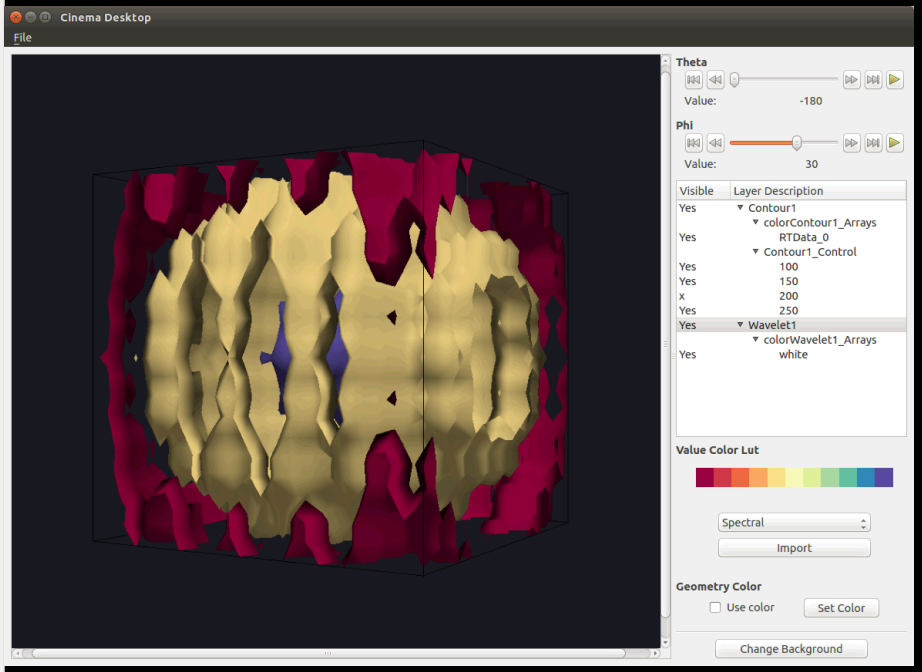
Improved Ruler

- Always visible annotation
- Customizable labels
- Scalable units



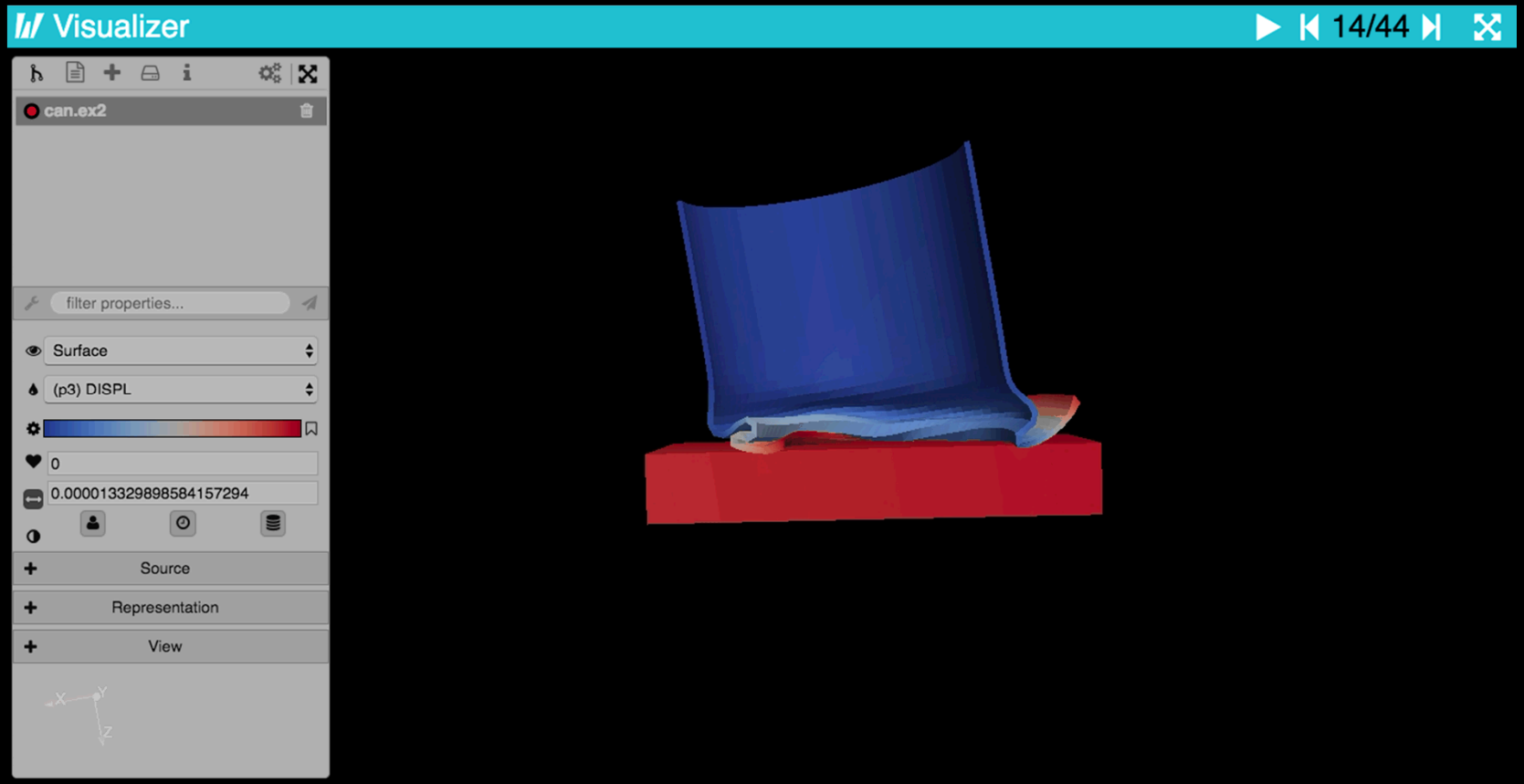
Cinema Database Export





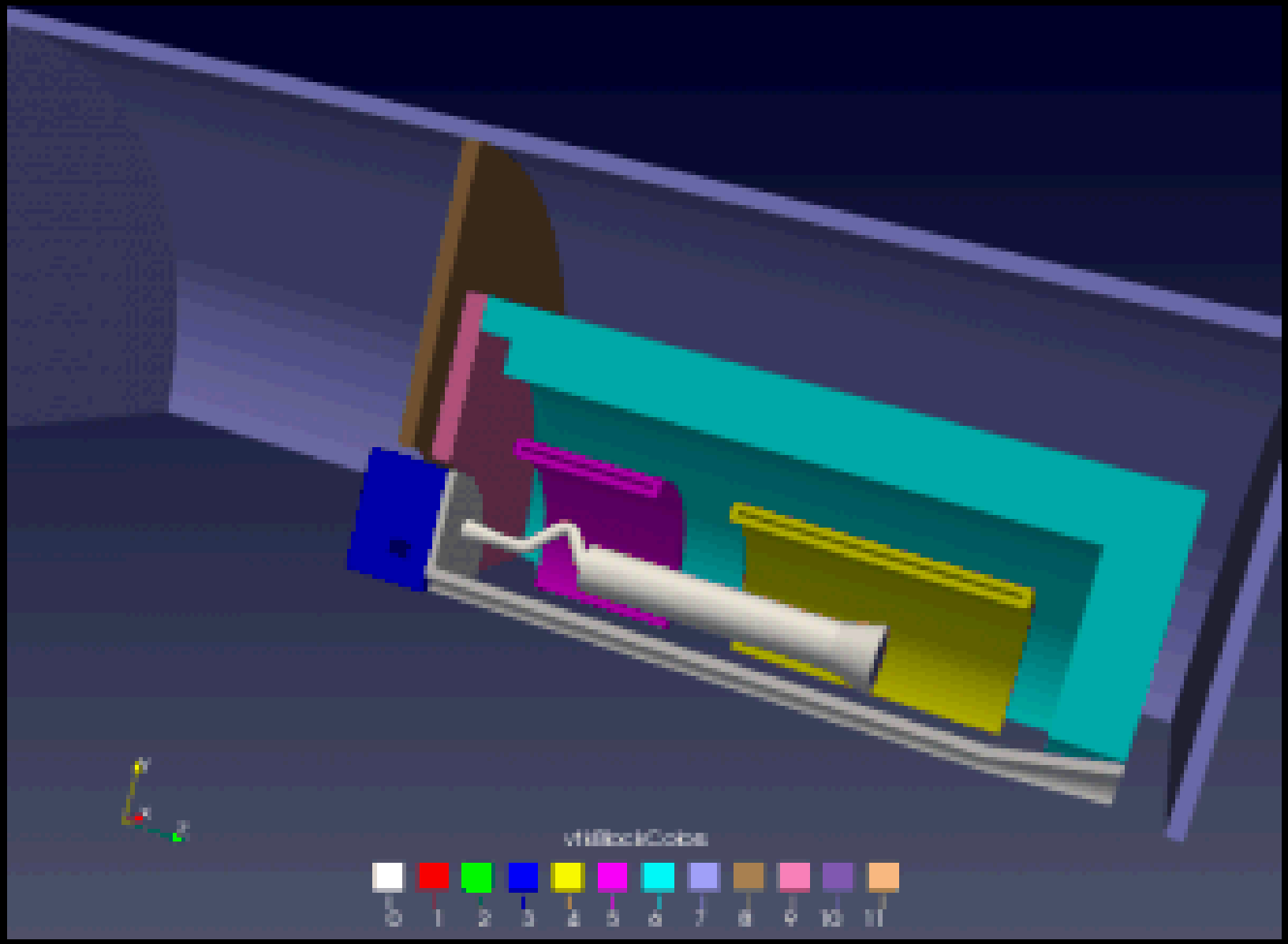
ParaViewWeb

- The ParaViewWeb Visualizer and LightViz are included
- Both use the new ParaViewWeb library

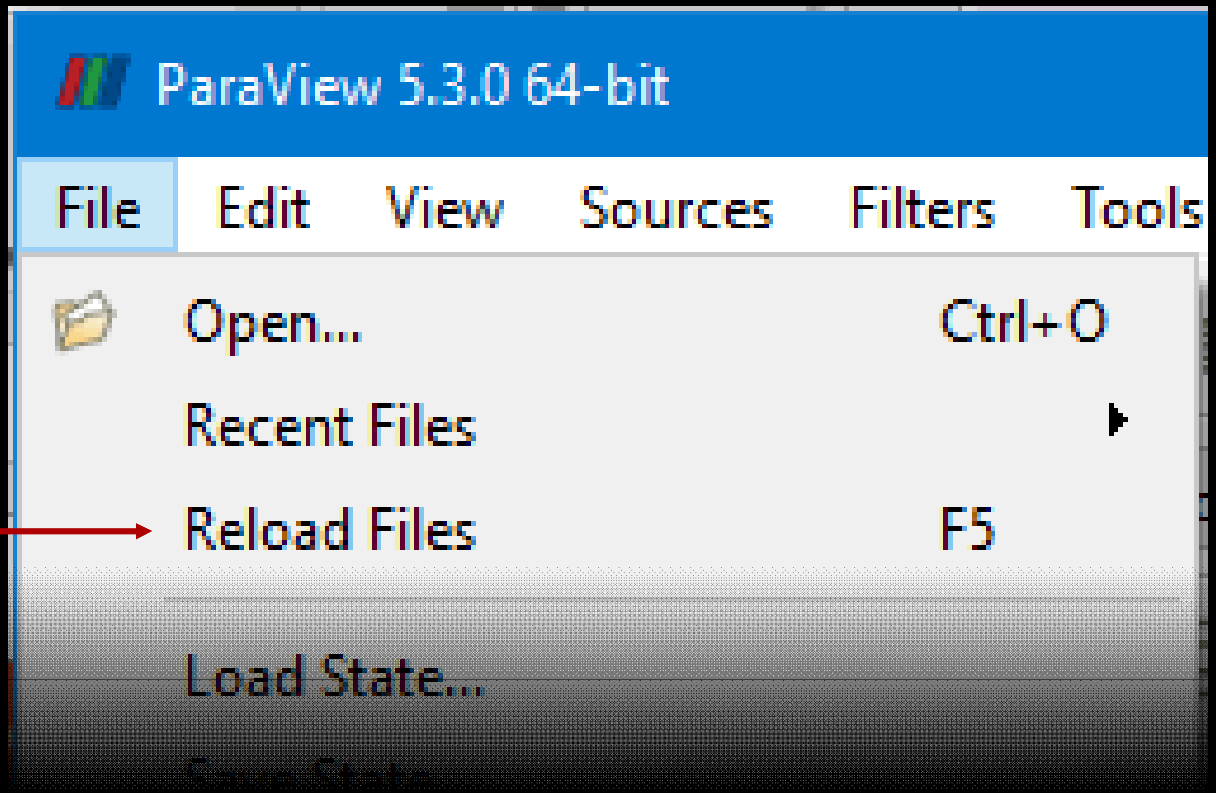


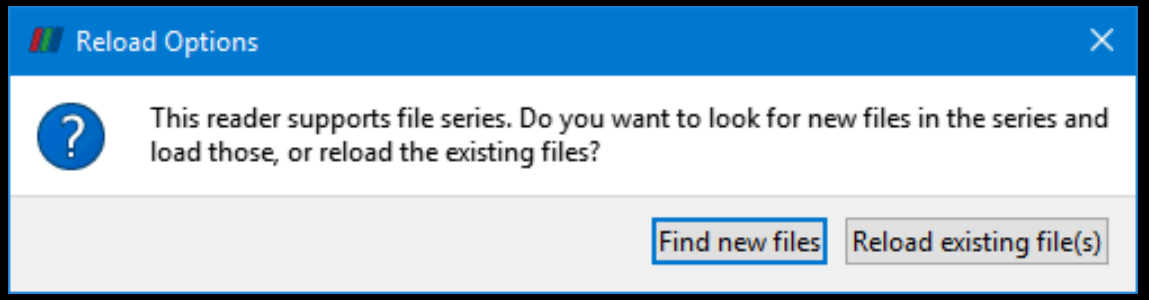
Data Management Improvements

New Readers

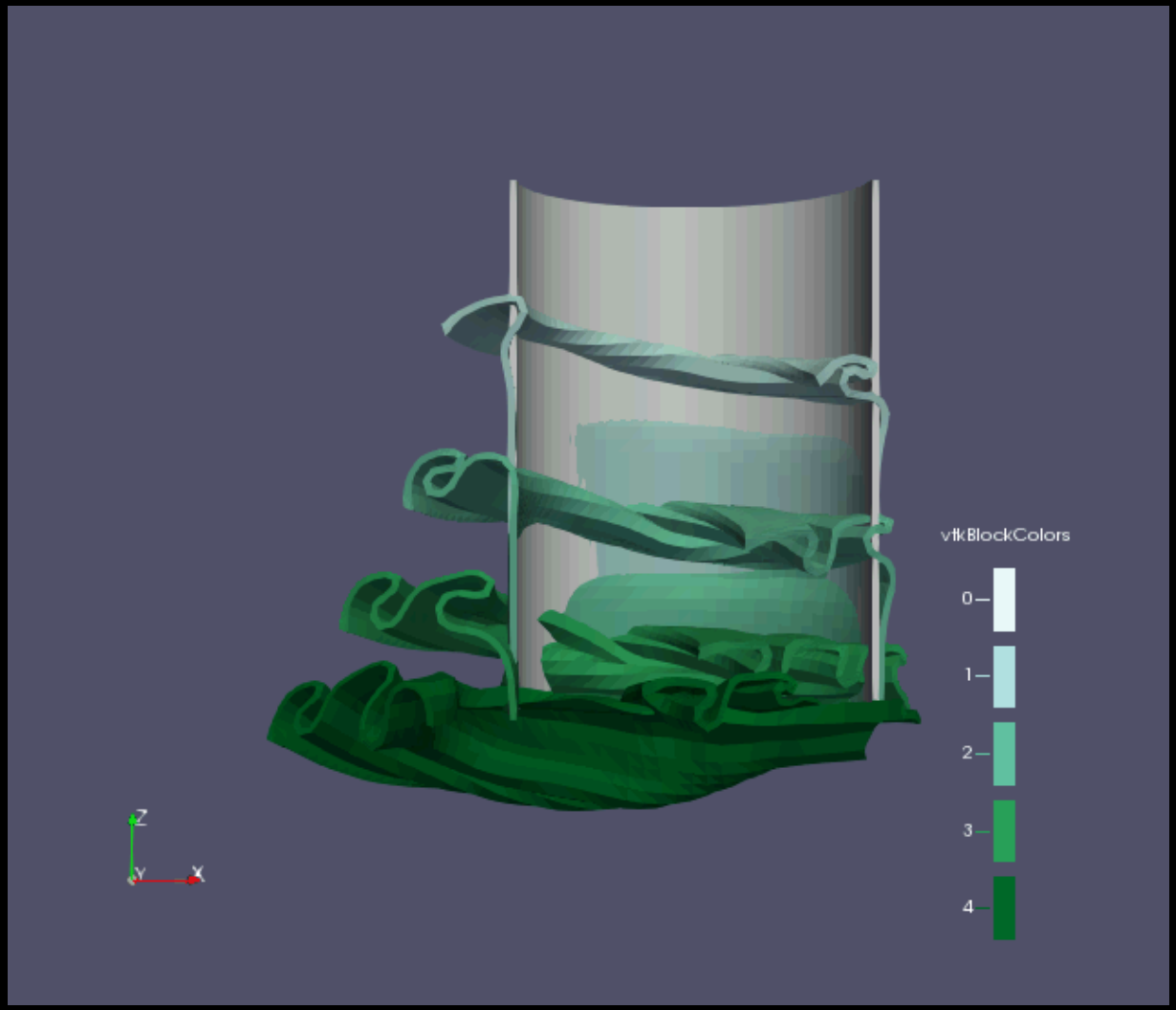


Reload Input Files

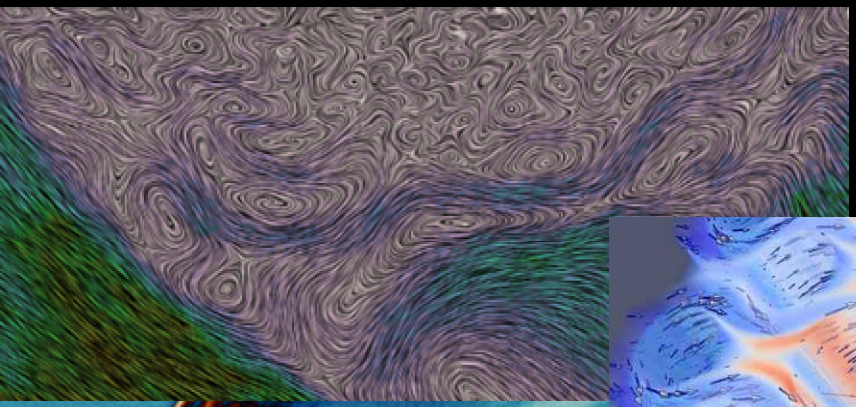


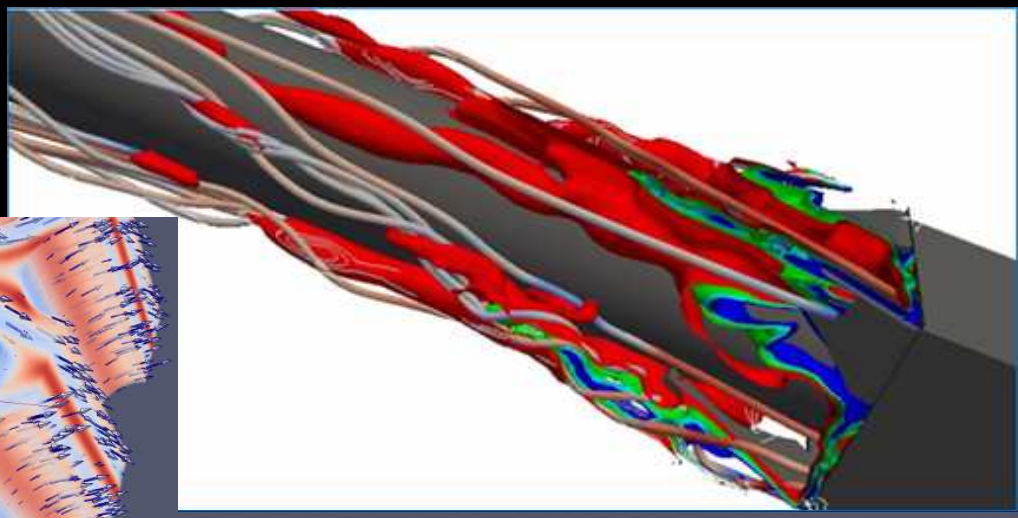


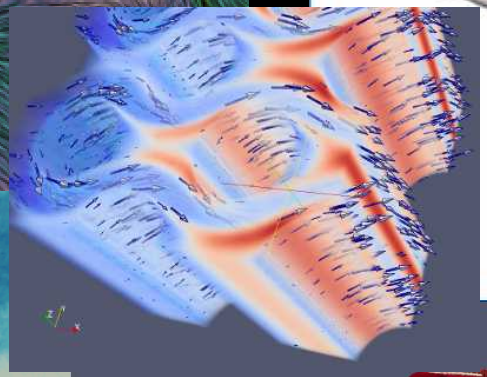
Extract and Group Time

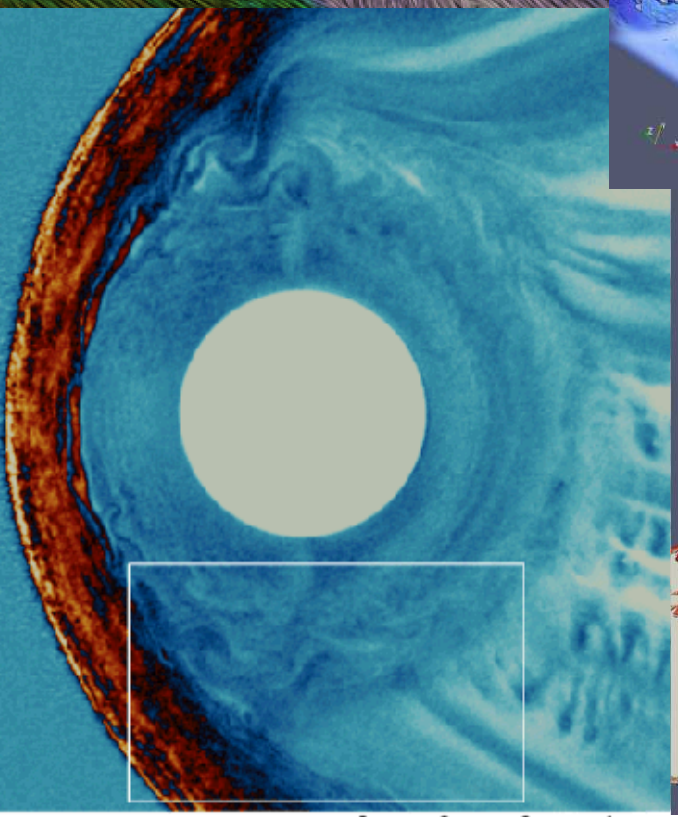


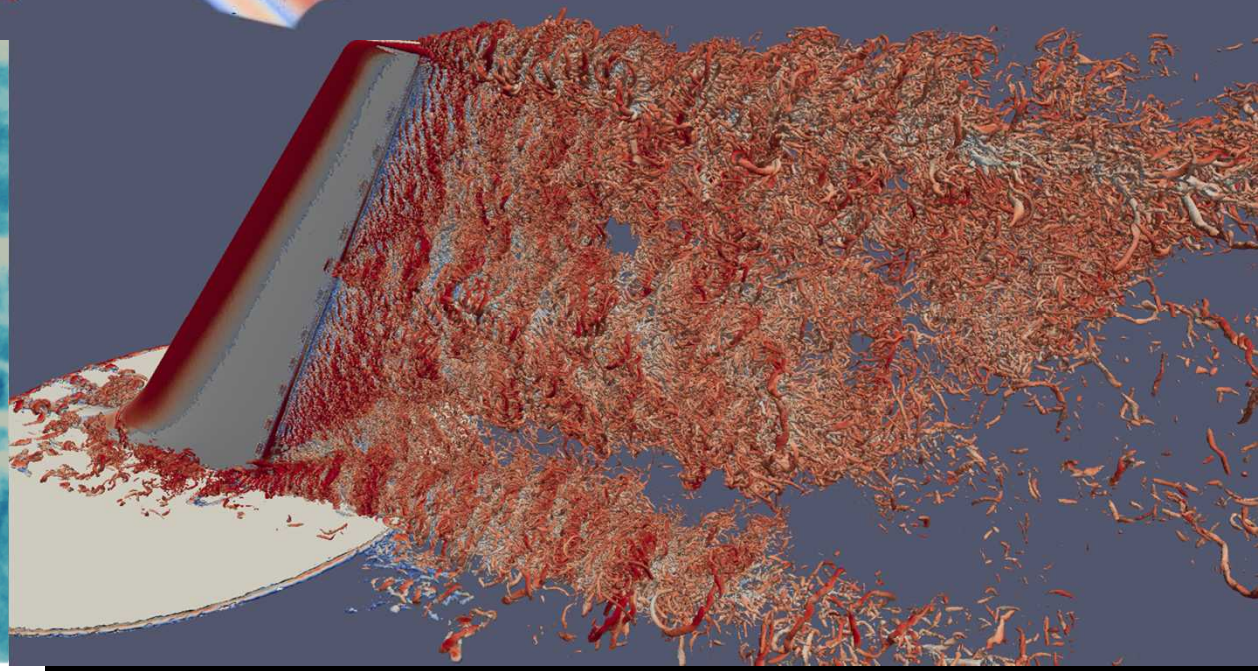
Catalyst

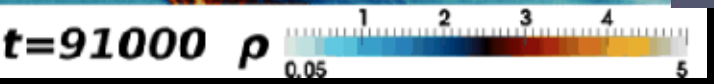








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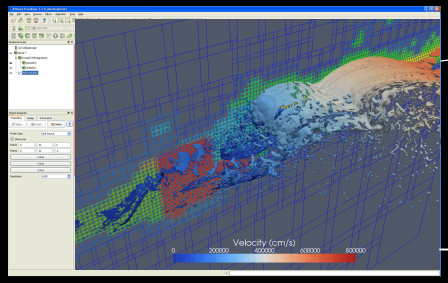
0.05
5



Script Export

```
# Create the reader and set the filename.
reader = servermanager.sources.Reader(FileNames=path)
view = servermanager.CreateRenderView()
repr = servermanager.CreateRepresentation(reader, view)
reader.UpdatePipeline()
dataInfo = reader.GetDataInformation()
pDinfo = dataInfo.GetPointDataInformation()
arrayInfo = pDInfo.GetArrayInformation("displacement9")
if arrayInfo:
 # get the range for the magnitude of displacement9
 range = arrayInfo.GetComponentRange(-1)
 lut = servermanager.rendering.PVLookupTable()
 lut.RGBPoints  = [range[0], 0.0, 0.0, 1.0,
                   range[1], 1.0, 0.0, 0.0]
 lut.VectorMode = "Magnitude"
 repr.LookupTable = lut
 repr.ColorArrayName = "displacement9"
 repr.ColorAttributeType = "POINT_DATA"
```

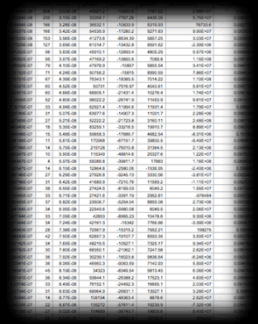
Augmented script in input deck.

Simulation

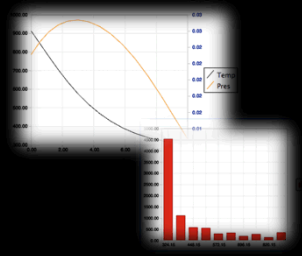
ParaView Catalyst

Live Connect

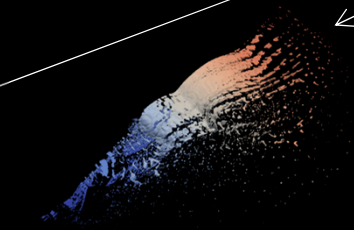
Output Processed Data



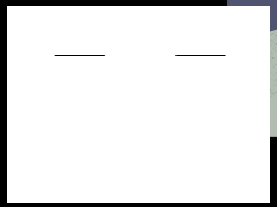
Statistics



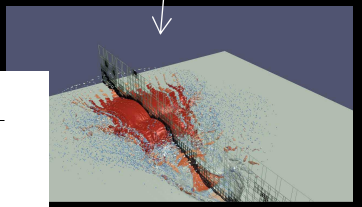
Line Series



Polygonal Surfaces Field Data

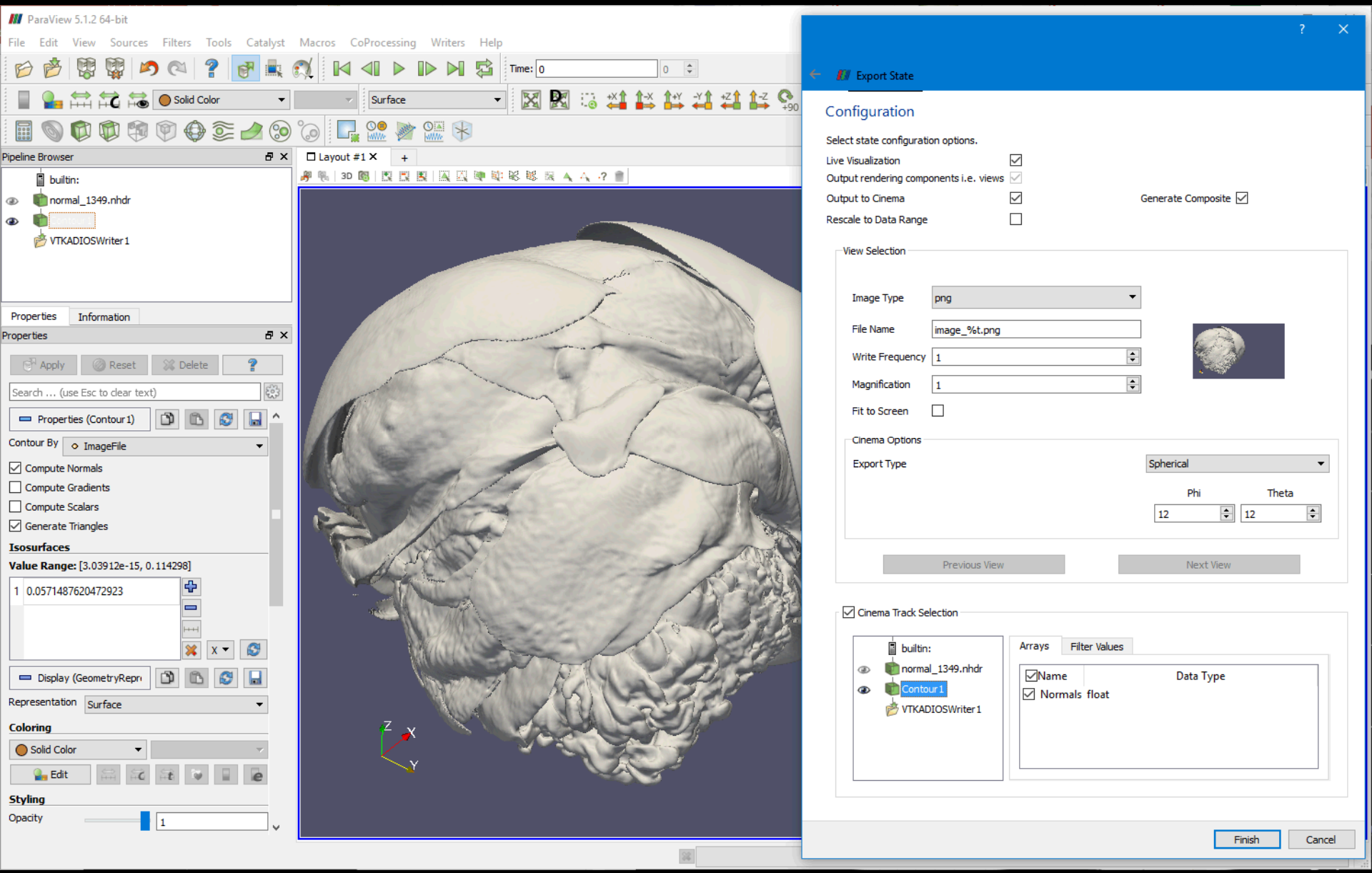


Cinema Database Support

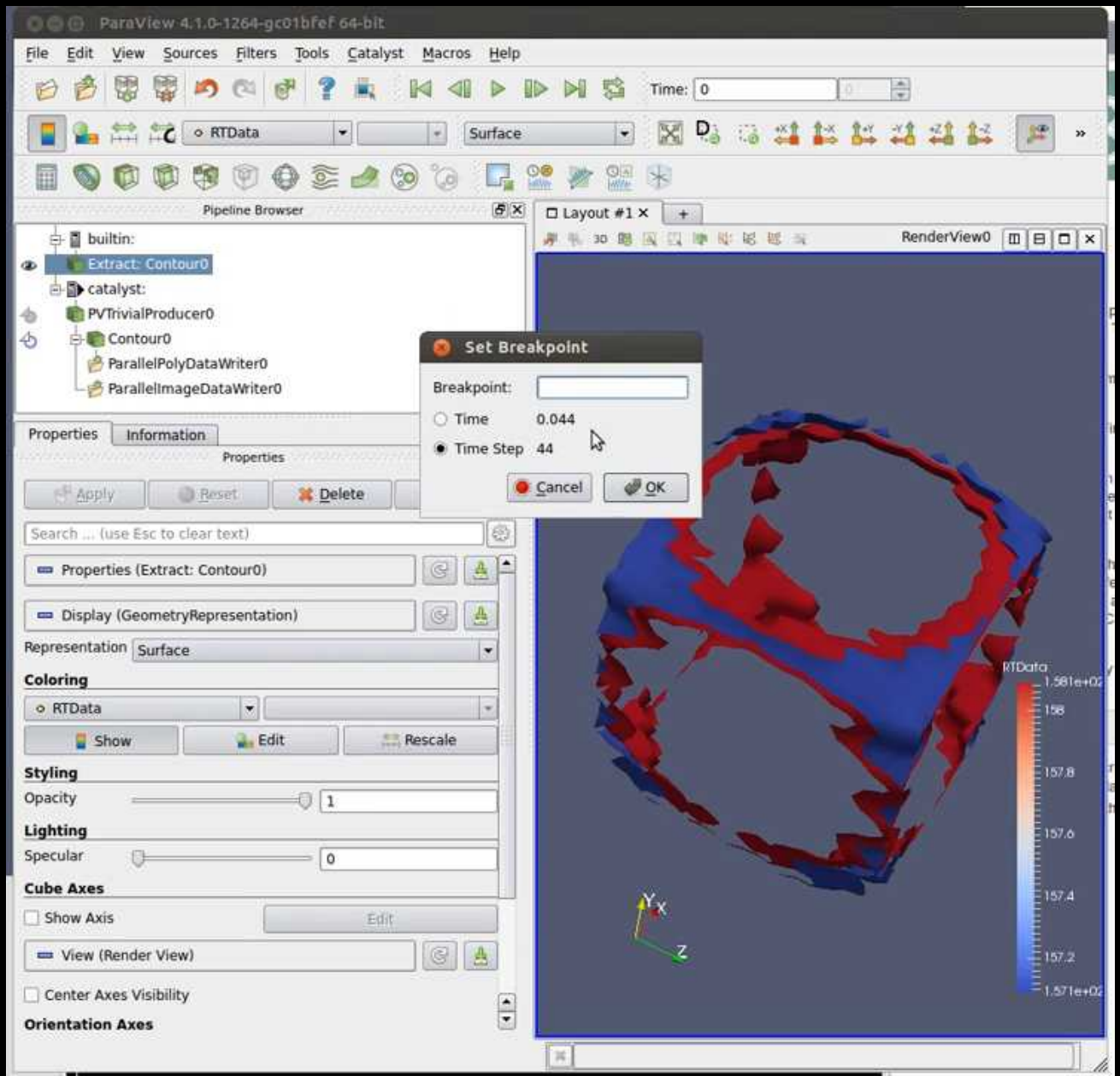


Rendered Images

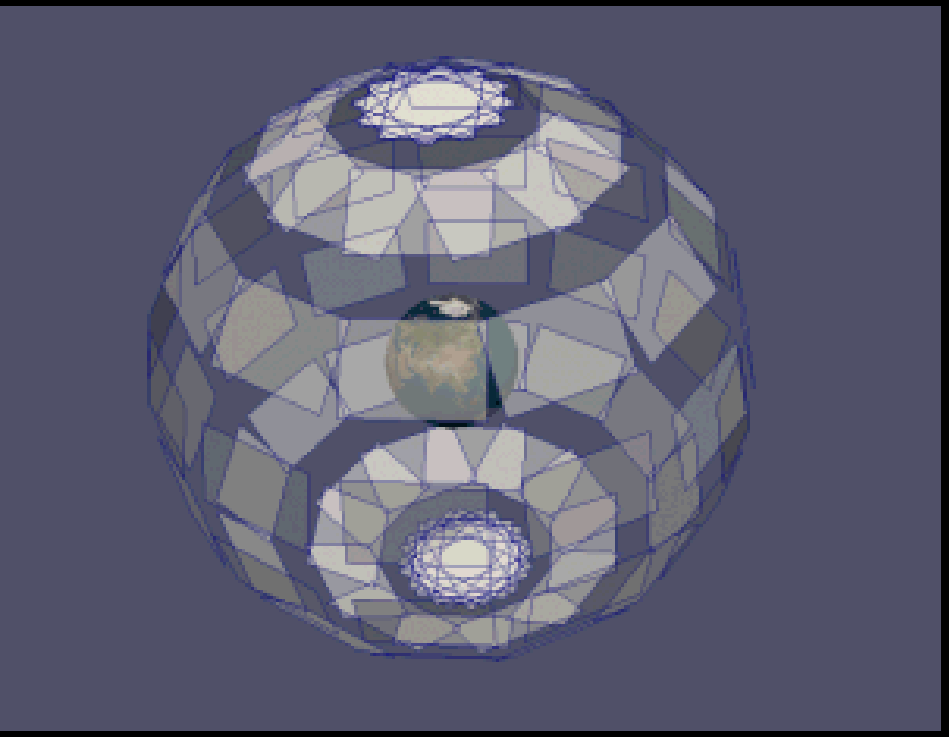
Improved Catalyst Exporter



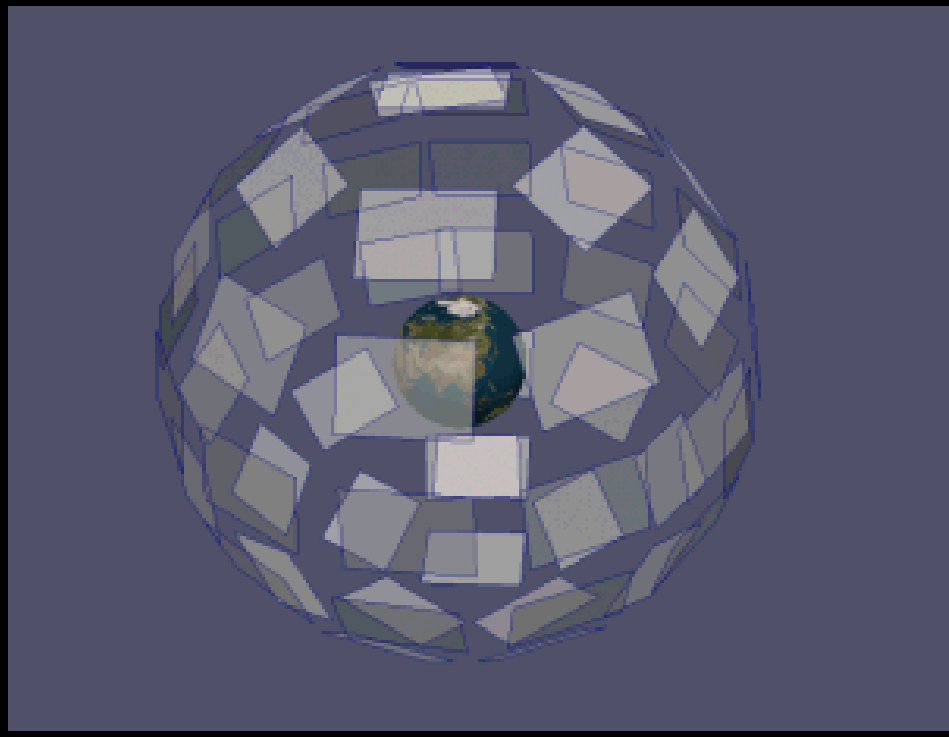
Interactive Connect to Catalyst



Support for Cinema Spec Chaplin

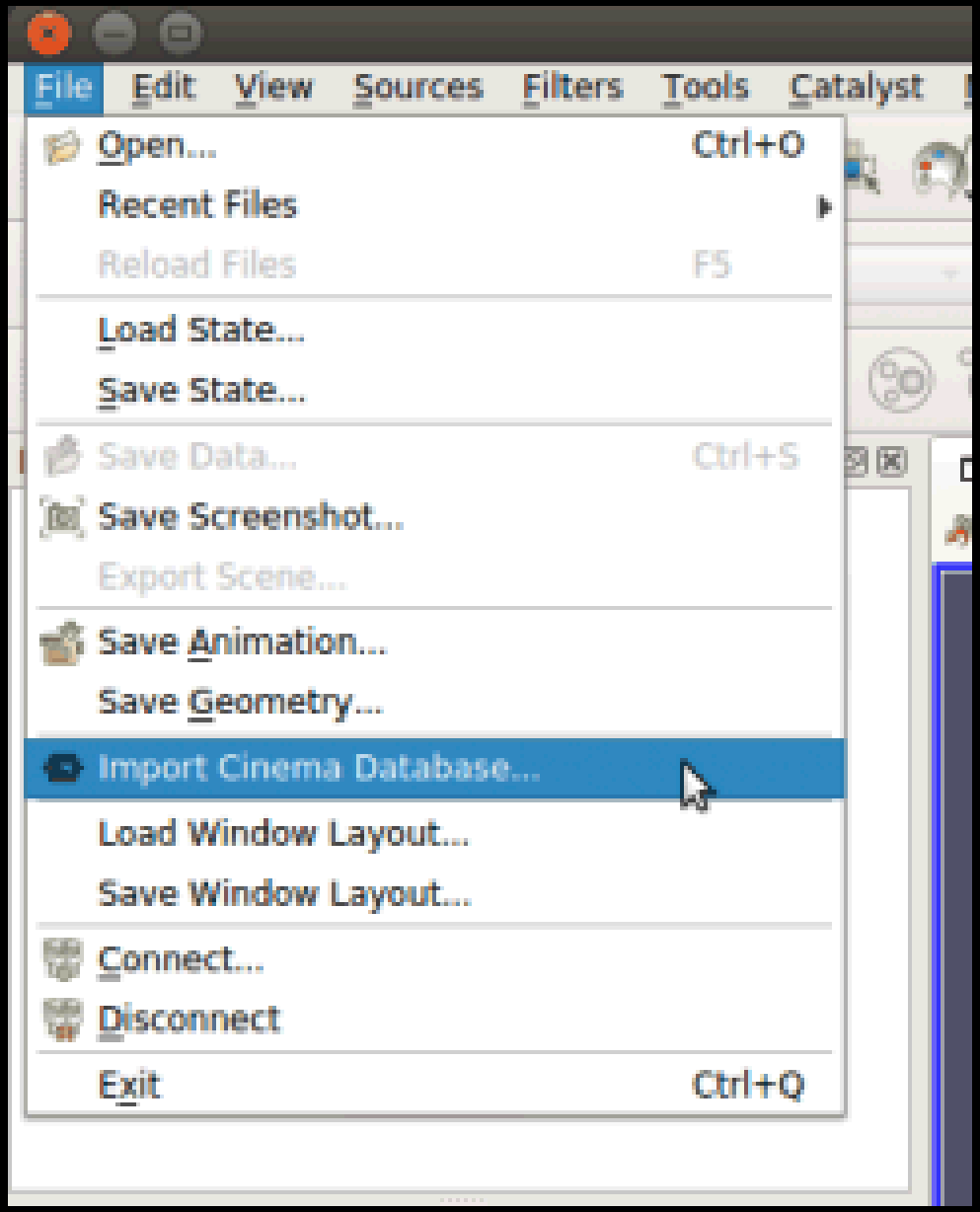


Old Spec



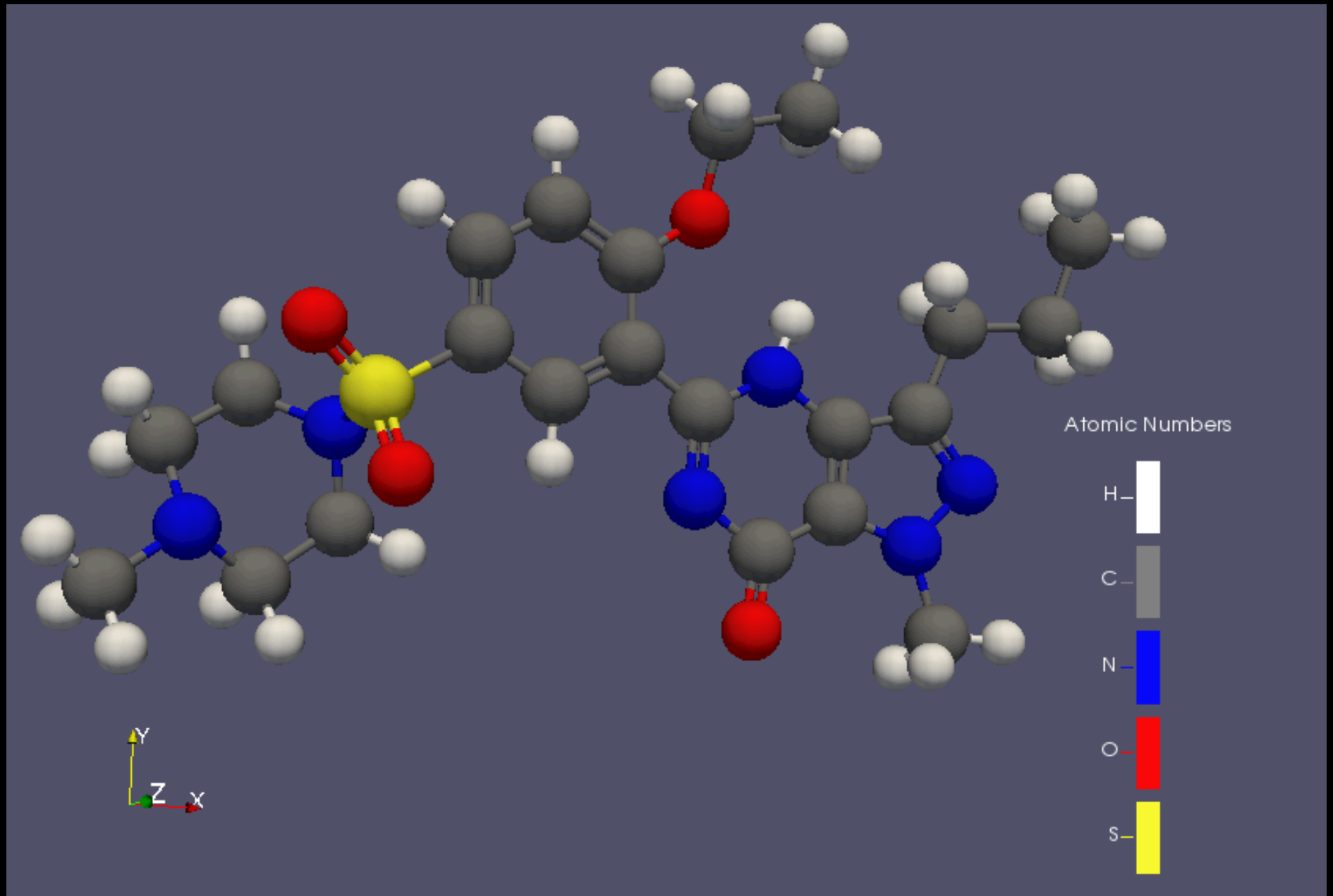
New Spec

Read Cinema Databases



Data Display Improvements

Improved Molecule Rendering



Stream Lines Representation

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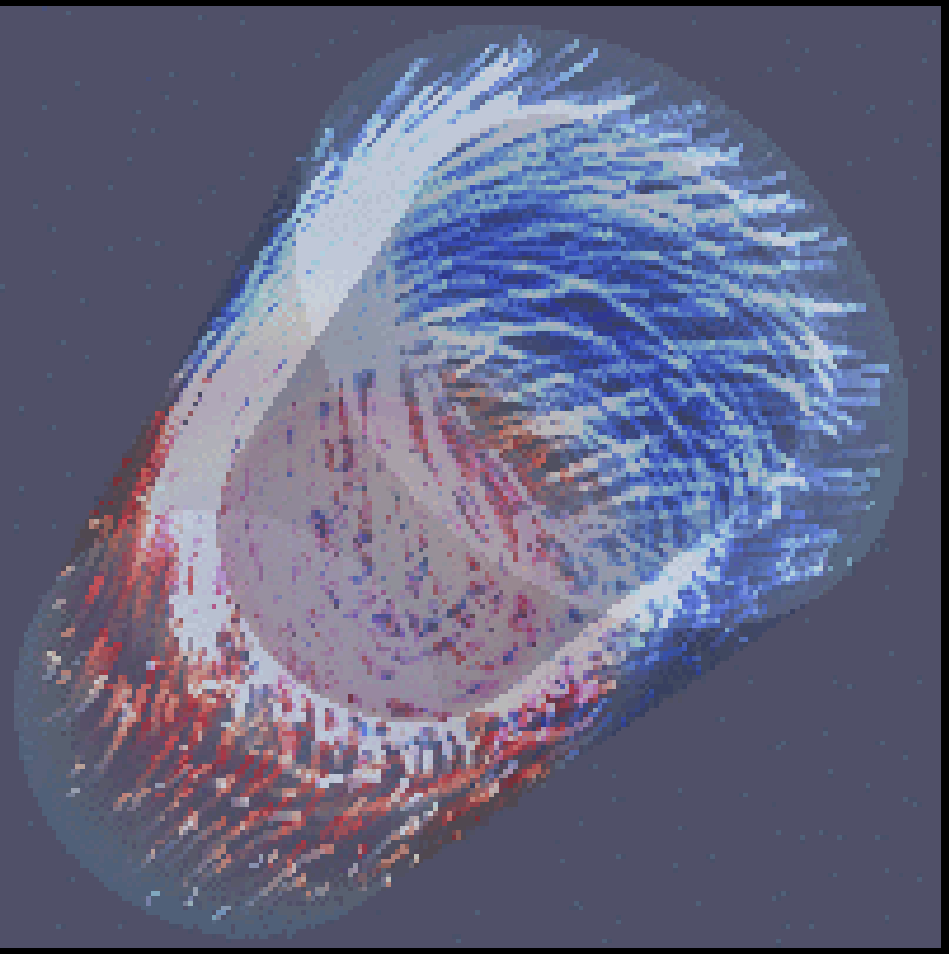

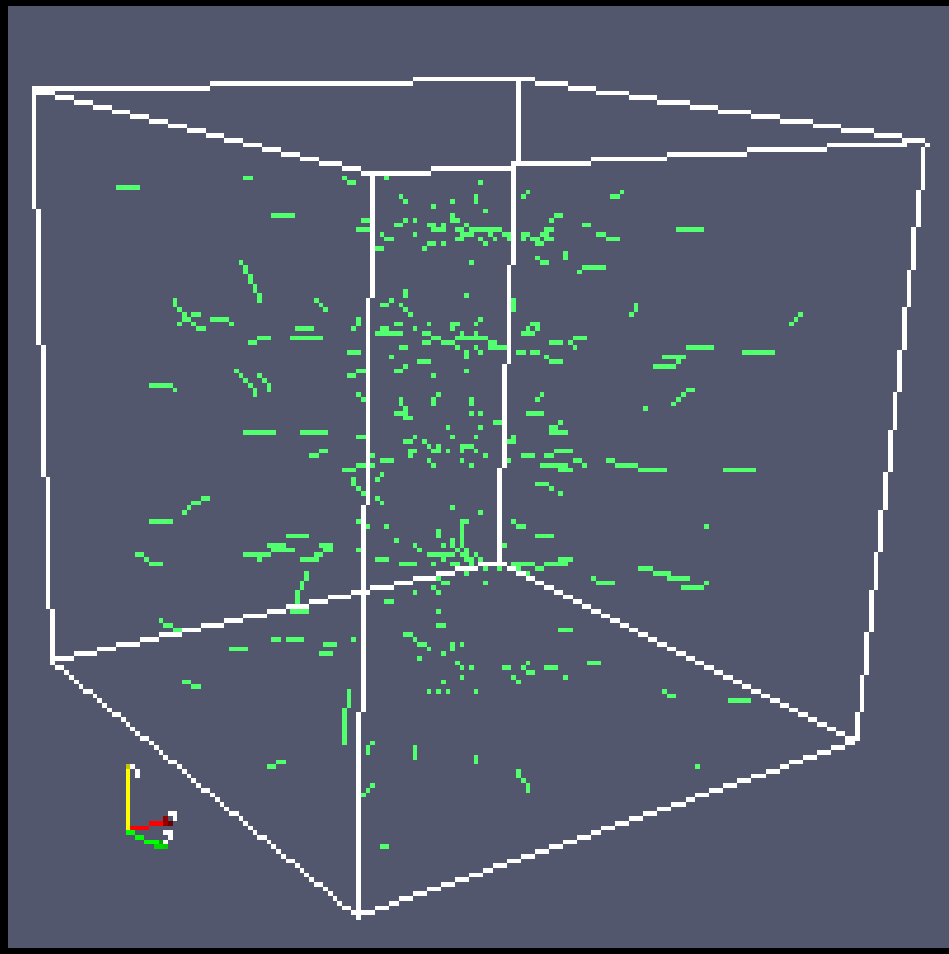

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Rendering Improvements

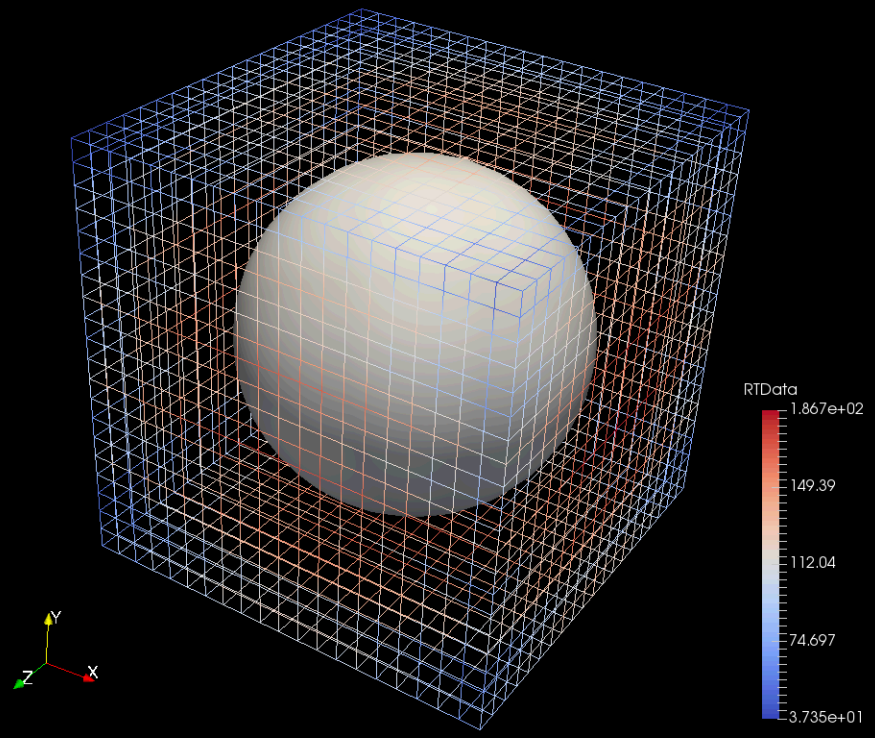
Faster Rendering

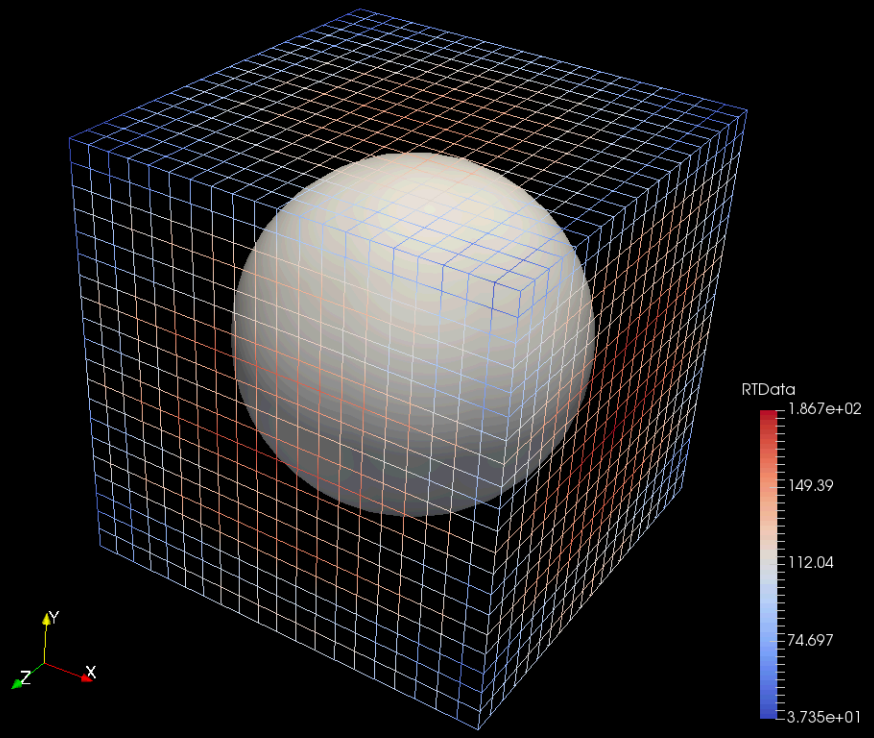
Sandia National Laboratories

OpenGL1 versus 2 CompositePolyDataMapper2								
	OpenGL1			New OpenGL2			Improvement	
Test	First	Average	Frame Rate	First	Average	Frame Rate	First	Average
MixedGeometryCellScalars	3.75	0.319	3.1	0.11	0.0131	76.3	3409%	2435%
CellScalars	0.3	0.0433	23.1	0.094	0.002	500.0	319%	2165%
Scalars	0.4	0.0394	25.4	0.083	0.001875	533.3	482%	2101%
Default	0.293	0.039	25.6	0.11	0.00215	465.1	266%	1814%
MixedGeometryEdges	6.586	0.5	2.0	0.11	0.01567	63.8	5987%	3191%
Average							2093%	2341%

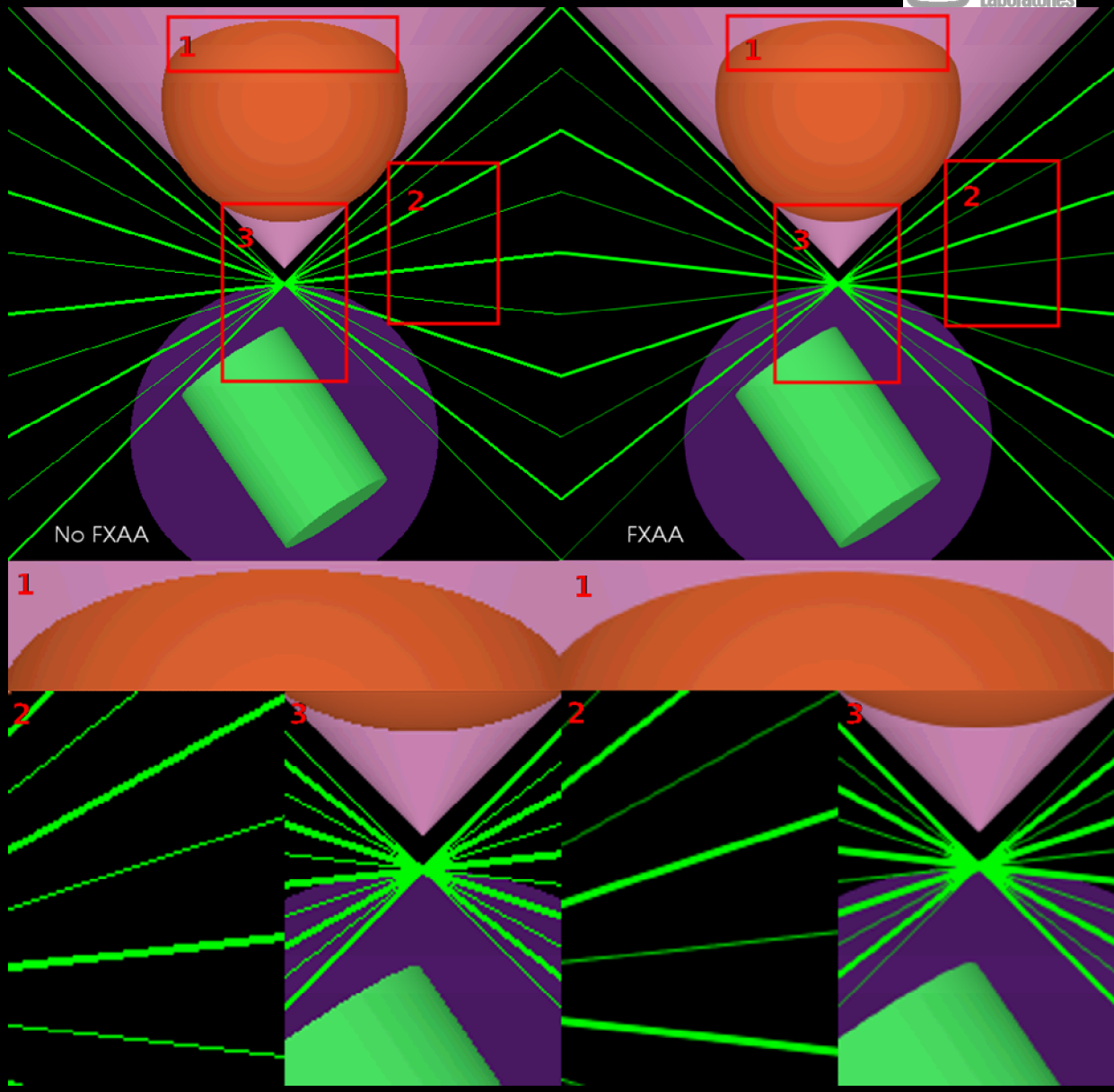
Posted by Ken Martin to ParaView mailing list, October 11, 2016

Hidden Line Removal

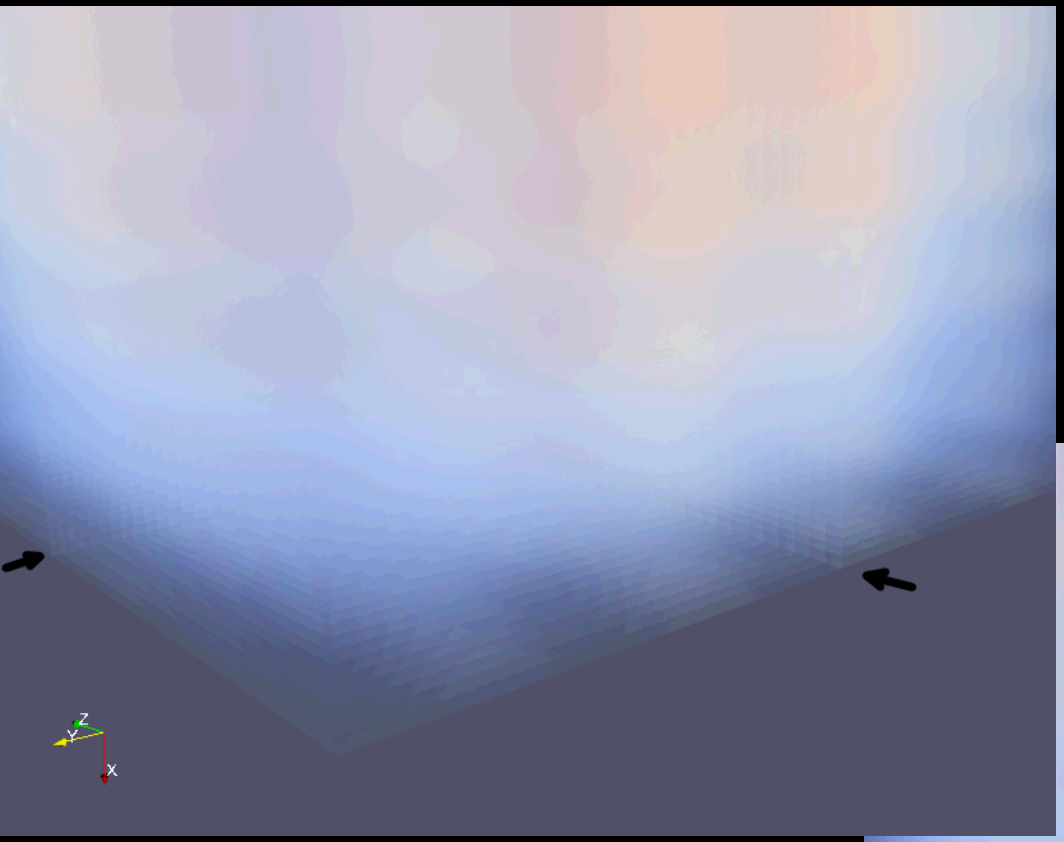


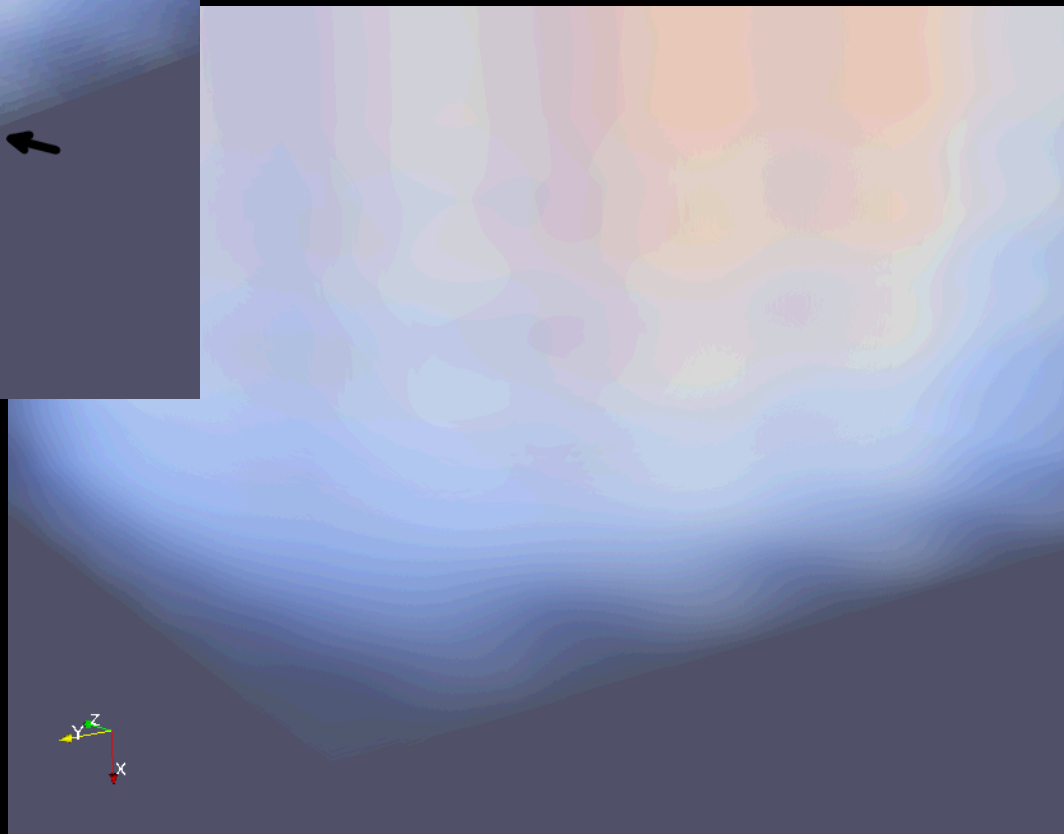


FXAA Antialiasing

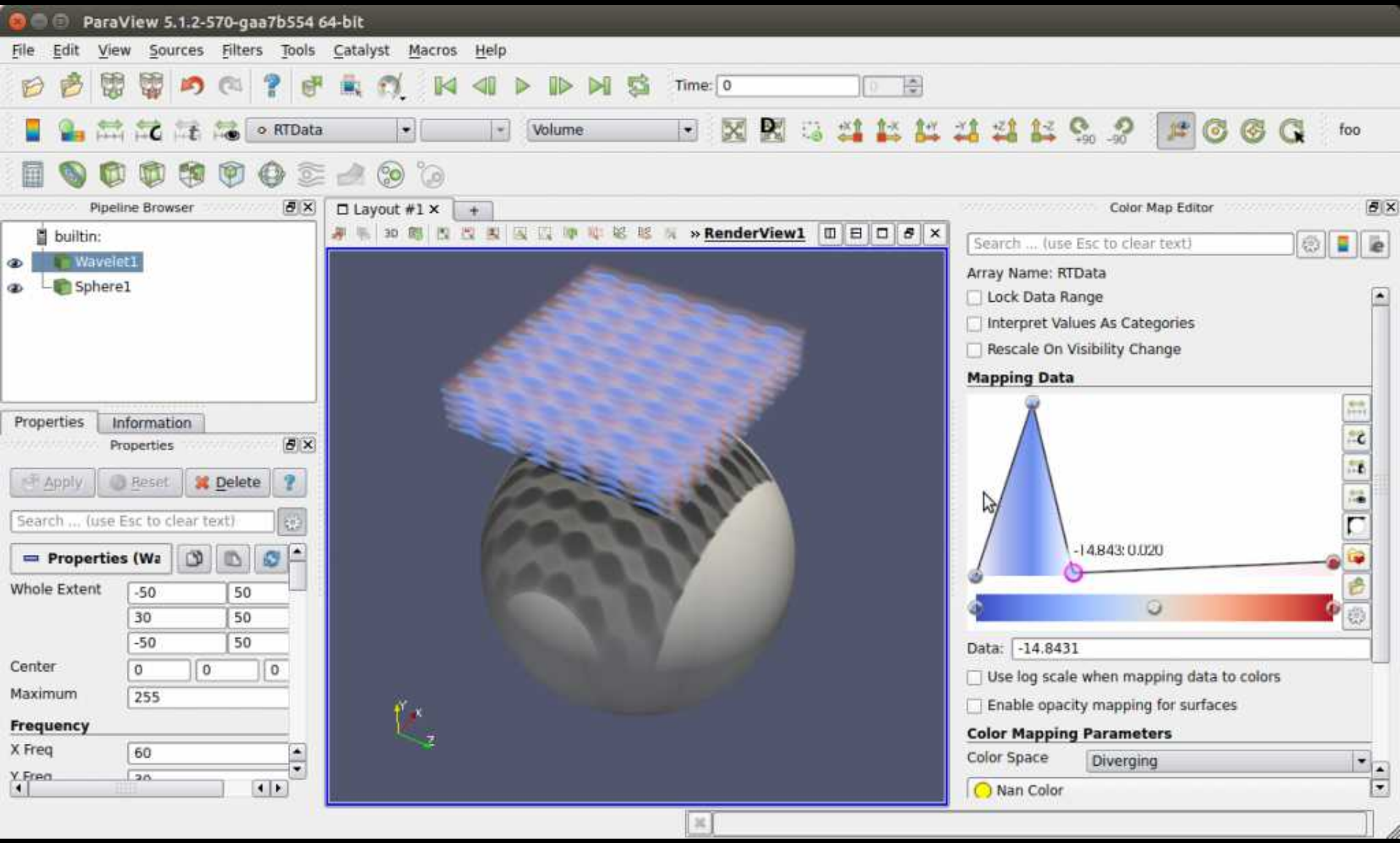


Corrected Seams in Parallel Sampling



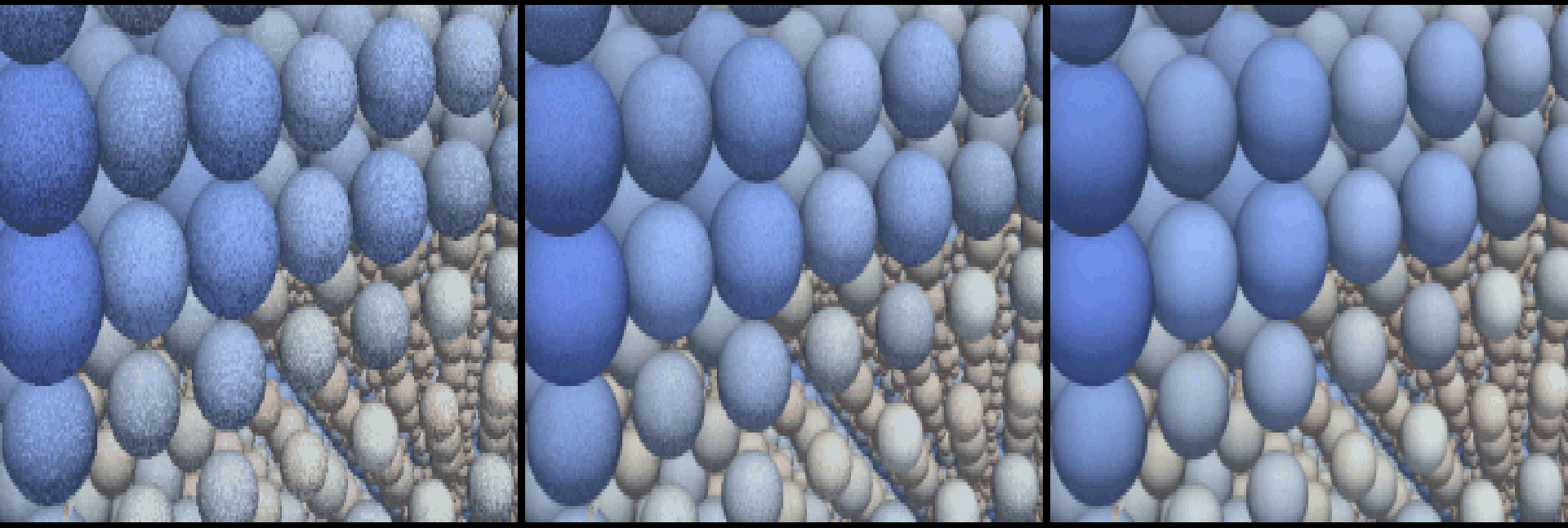


OSPRay Rendering

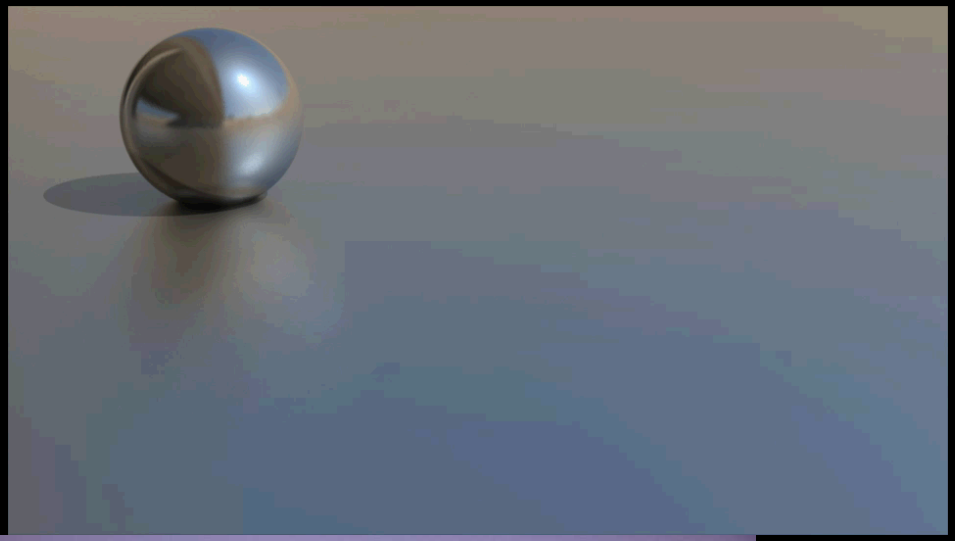


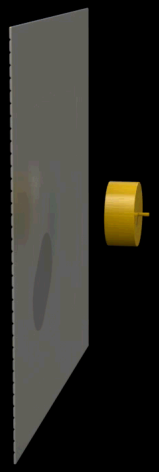
Progressive OSPRay Rendering

Sandia National Laboratories



Houdini File Output

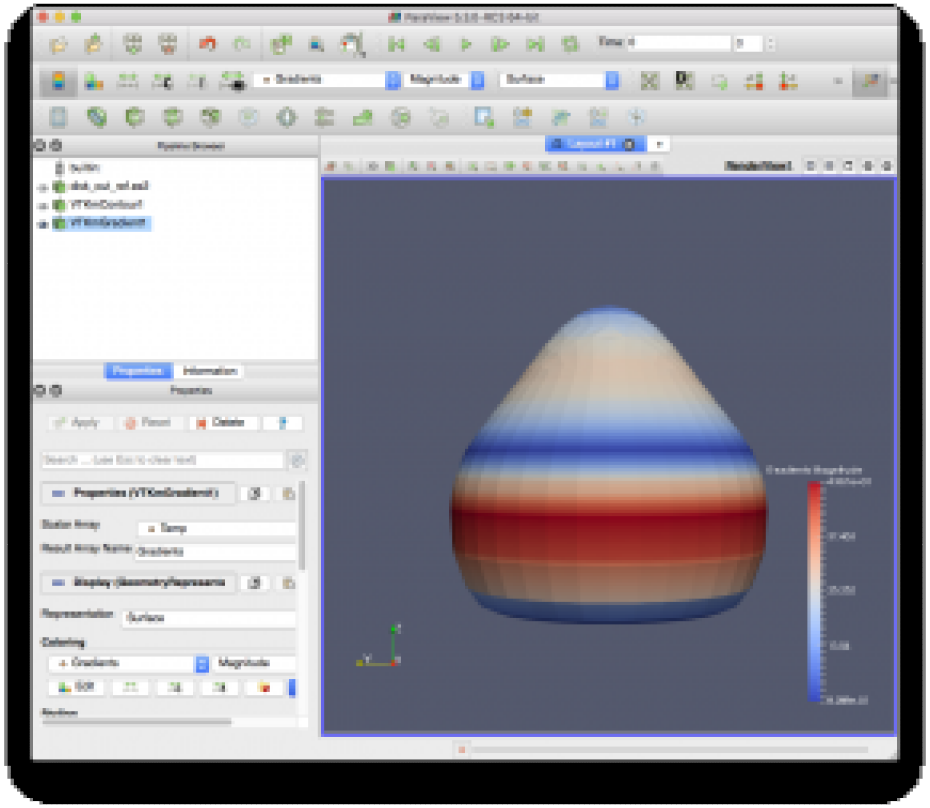


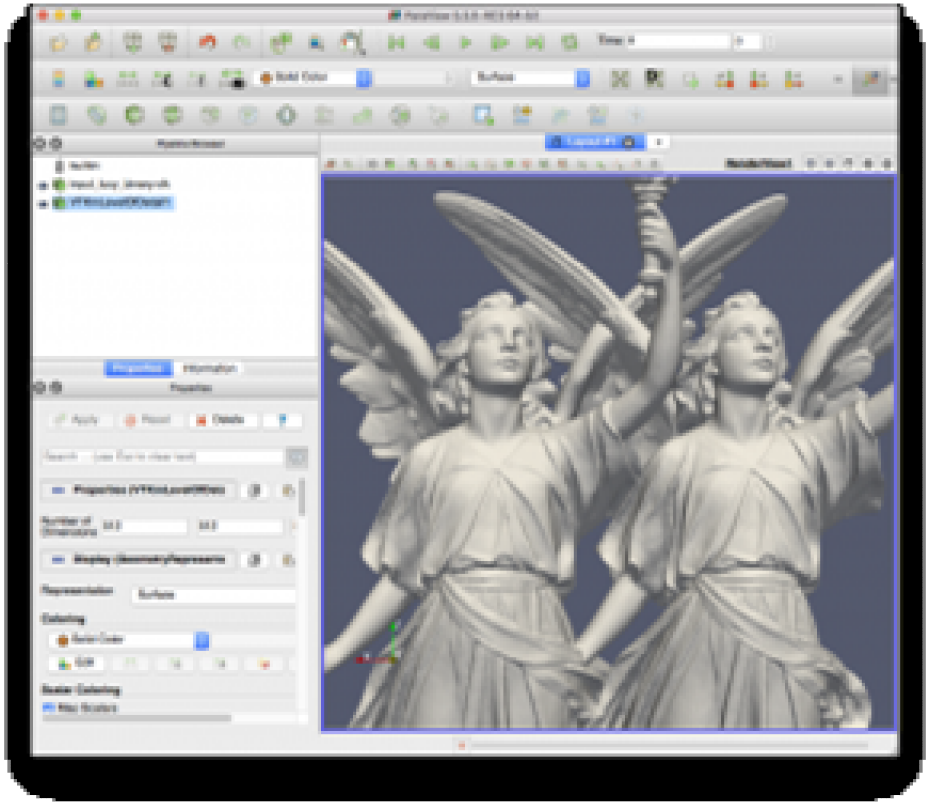


Performance Improvements

VTK-m Plugin

Sandia National Laboratories





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Everything Else

Bug Fixes and Minutiae

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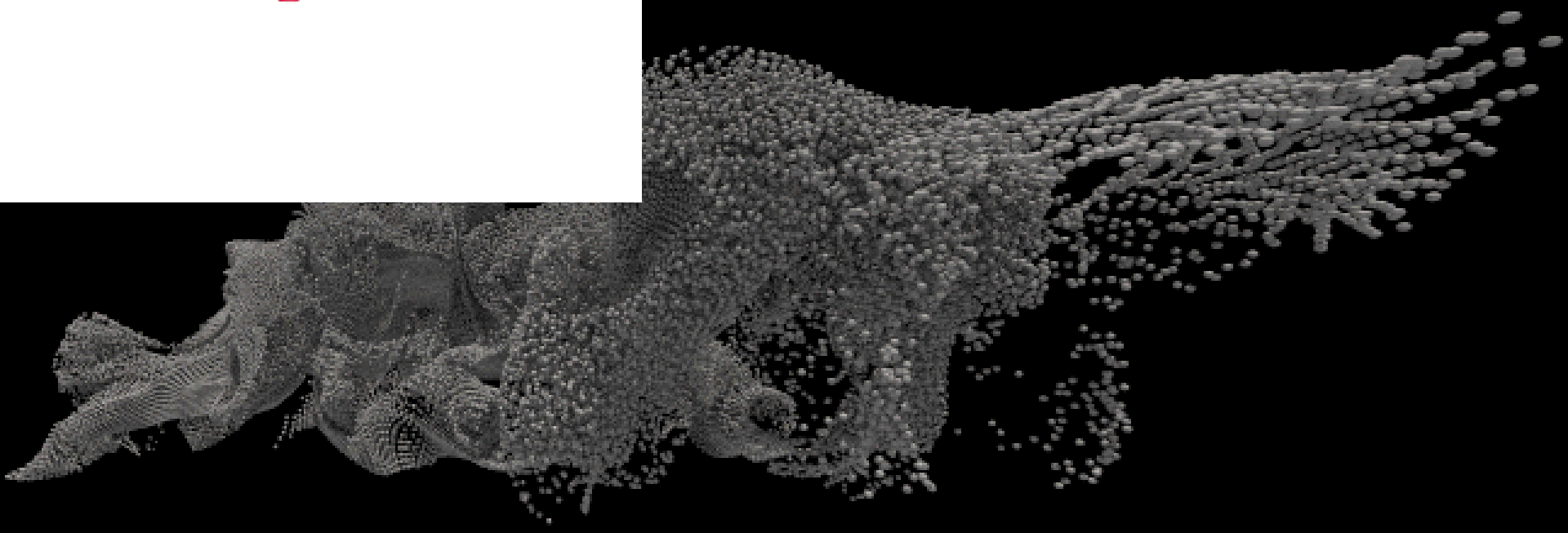
- ParaView 4.4: ~325 issues resolved
- ParaView 5.0: ~200 issues resolved
- ParaView 5.1: ~125 issues resolved
- ParaView 5.2: ~200 issues resolved
- ParaView 5.3: ~170 issues resolved

2017

The 7th IEEE Symposium on Large Data Analysis and Visualization

in conjunction with IEEE VIS 2017,
Phoenix, Arizona, October 2, 2017



Abstracts Due: June 9

Papers Due: June 16