



IEEE Vis ParaView Tutorial

October 2009

Kenneth Moreland **Nathan Fabian**
David Thompson **Philippe Pebay**
Sandia National Laboratories

David DeMarle
Kitware, Inc.

James Ahrens
Los Alamos National Laboratories



Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.





Agenda

XX:XX	What's New	Kenneth Moreland
XX:XX	Customizing ParaView with Plugins	Kenneth Moreland
XX:XX	<i>Break</i>	
XX:XX	Python Scripting	David DeMarle
XX:XX	<i>Lunch</i>	
XX:XX	Petascale Distance Visualization	James Ahrens
XX:XX	<i>In-Situ</i> Visualization: Integration	David Thompson
XX:XX	<i>Break</i>	
XX:XX	<i>In-Situ</i> Visualization: Bridging	Nathan Fabian
XX:XX	Statistics	Philippe Pebay



Tutorial Rules

- **Ask Questions**
- **Fill Out Comment Form**
- **Watch Some If You Cannot Watch It All**



Obligatory Funding and Contributors Slide



Sandia
National
Laboratories



Swiss National
Supercomputing
Centre

- Army SBIR
- ERDC Contract
- US NSF SBIR

- Support Contracts
 - Electricity de France
 - Mirarco
 - Oil Industry



What's New

IEEE Vis ParaView Tutorial

October 2009

Kenneth Moreland
Sandia National Laboratories



Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,
for the United States Department of Energy's National Nuclear Security Administration
under contract DE-AC04-94AL85000.





Python API

Old Script

```
from paraview import servermanager

if not servermanager.ActiveConnection:
    servermanager.Connect()
pm = servermanager.ProxyManager()

if len(pm.GetProxiesInGroup("views")) > 0:
    view = pm.GetProxiesInGroup("views").values()[0]
else:
    view = servermanager.CreateRenderView()

sphere = servermanager.sources.SphereSource()
sphere.ThetaResolution = 36
sphere.PhiResolution = 36
pm.RegisterProxy("sources", "sphere", sphere)

elevation = servermanager.filters.ElevationFilter(Input=sphere)
elevation.LowPoint = [-0.5, 0.0, 0.0]
elevation.HighPoint = [0.5, 0.0, 0.0]
pm.RegisterProxy("sources", "elevation", elevation)

elevrep = servermanager.CreateRepresentation(elevation, view)
pm.RegisterProxy("representations", "elevrep", elevrep)
lt = servermanager.rendering.PVLookupTable()
lt.RGBPoints = [0, 0, 0, 1, 1, 1, 0, 0] # Blue to Red
lt.ColorSpace = 1 # HSV
elevrep.LookupTable = lt
elevrep.ColorAttributeType = 0 # point data
elevrep.ColorArrayName = "Elevation"

view.ResetCamera()
view.StillRender()
```

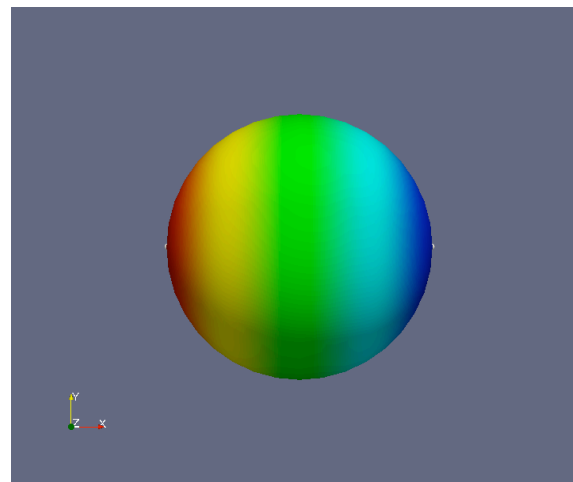
New Script

```
from paraview.simple import *

sphere = Sphere()
sphere.ThetaResolution = 36
sphere.PhiResolution = 36

elevation = Elevation()
elevation.LowPoint = [-0.5, 0.0, 0.0]
elevation.HighPoint = [0.5, 0.0, 0.0]
SetDisplayProperties(ColorArrayName = "Elevation")
Show()

Render()
```



Time: 0 0

Solid Color Representation

+X -X +Y -Y +Z -Z

Pipeline Browser

builtin:

- points.csv
- TableToPoints1
- Glyph2

Showing points.csv Attribute: Row Data Precision: 6

	Radius	x	y	z	Row ID
0	0.70581	1.69715	1.06315	0.176519	0
1	0.658992	-0.846007	-0.928486	-0.472322	1
2	0.430791	-2.58414	-1.66631	-0.0441292	2
3	0.481172	-0.905612	0.513356	0.28491	3
4	0.652226	2.15247	0.981106	0.576655	4
5	0.671747	-1.09699	-0.482583	-0.623081	5

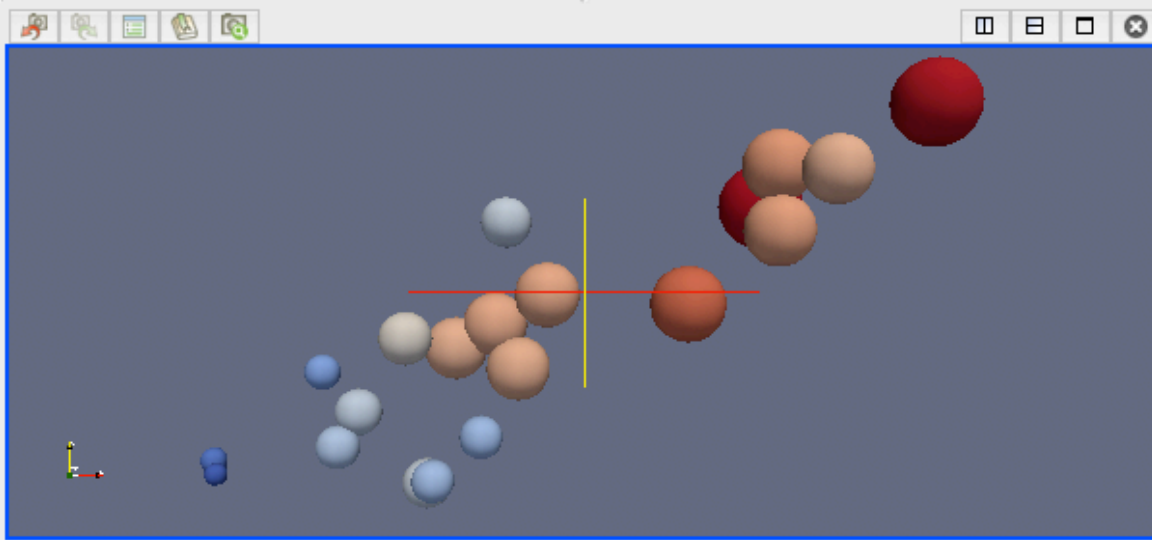
Object Inspector

Properties Display Information

Apply Reset Delete ?

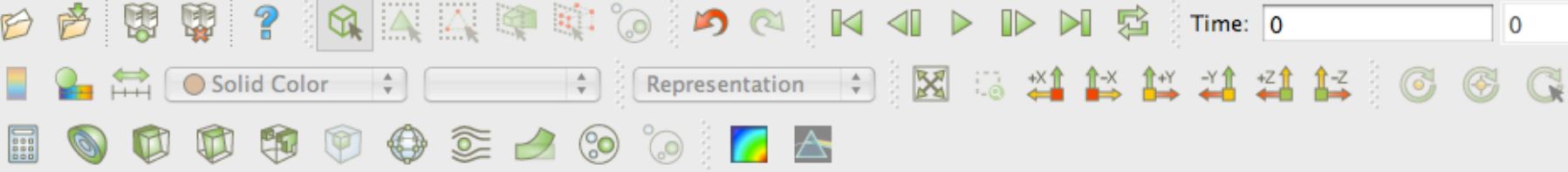
- Detect Numeric Columns
- Use String Delimiter
- Have Headers

Field Delimiter , Characters

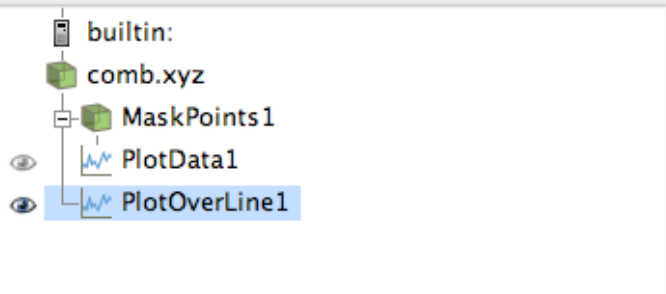


Close button and empty input field

Time: 0 0



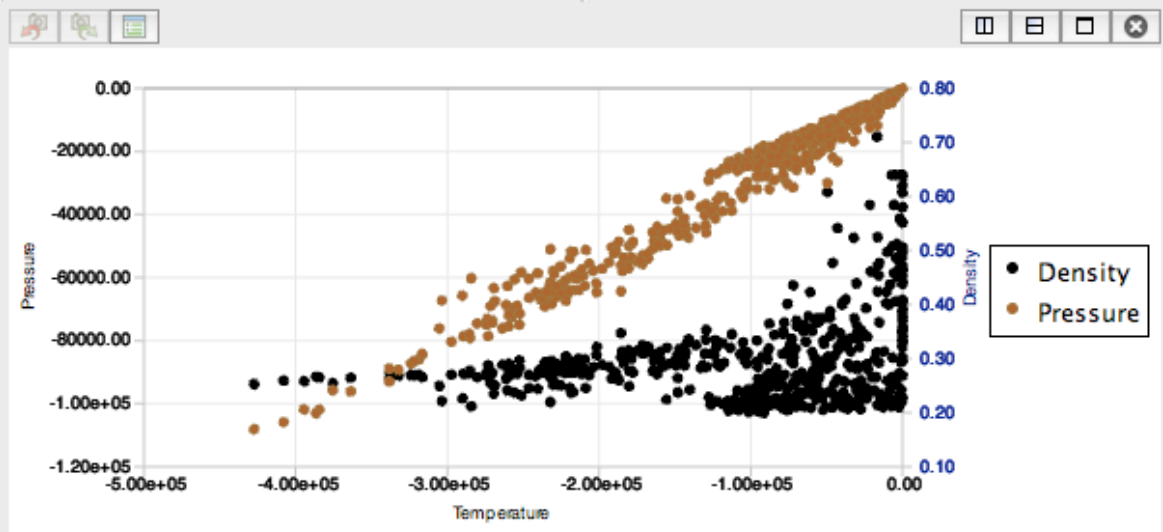
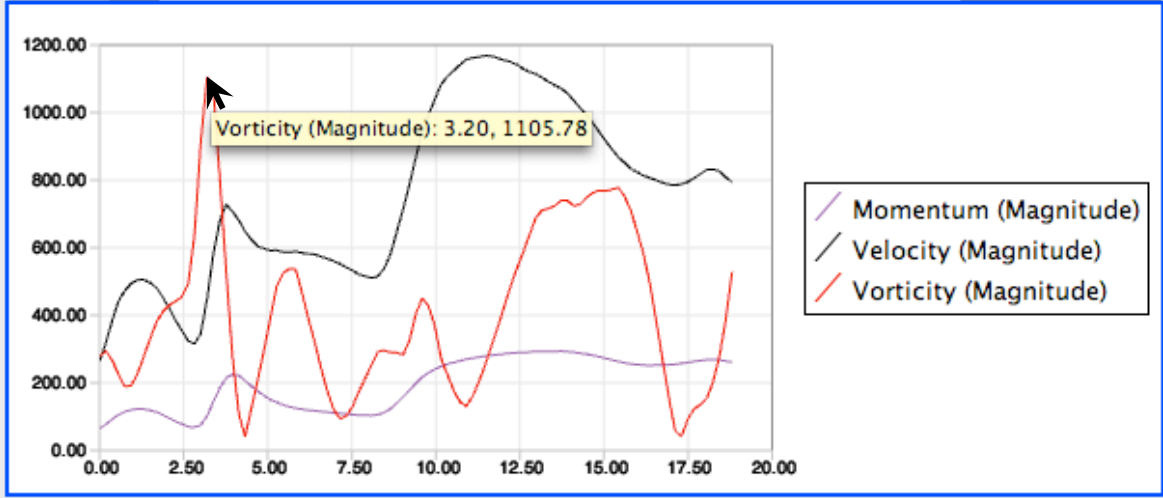
Pipeline Browser



Object Inspector

Properties Display Information

- Velocity (1)
 - Velocity (2)
 - Velocity (Magnit...)
 - Vorticity (0)
 - Vorticity (1)
 - Vorticity (2)
 - Vorticity (Magnit...)
 - Enable Line Series
- Line Color: ● Choose Col
- Line Thickness: 1
- Line Style: Solid
- Marker Style: None
- Chart Axes: Bottom-Left



Change a Filter's Input

Time: 0 0

Solid Color Representation

+X +Y +Z -X -Y -Z

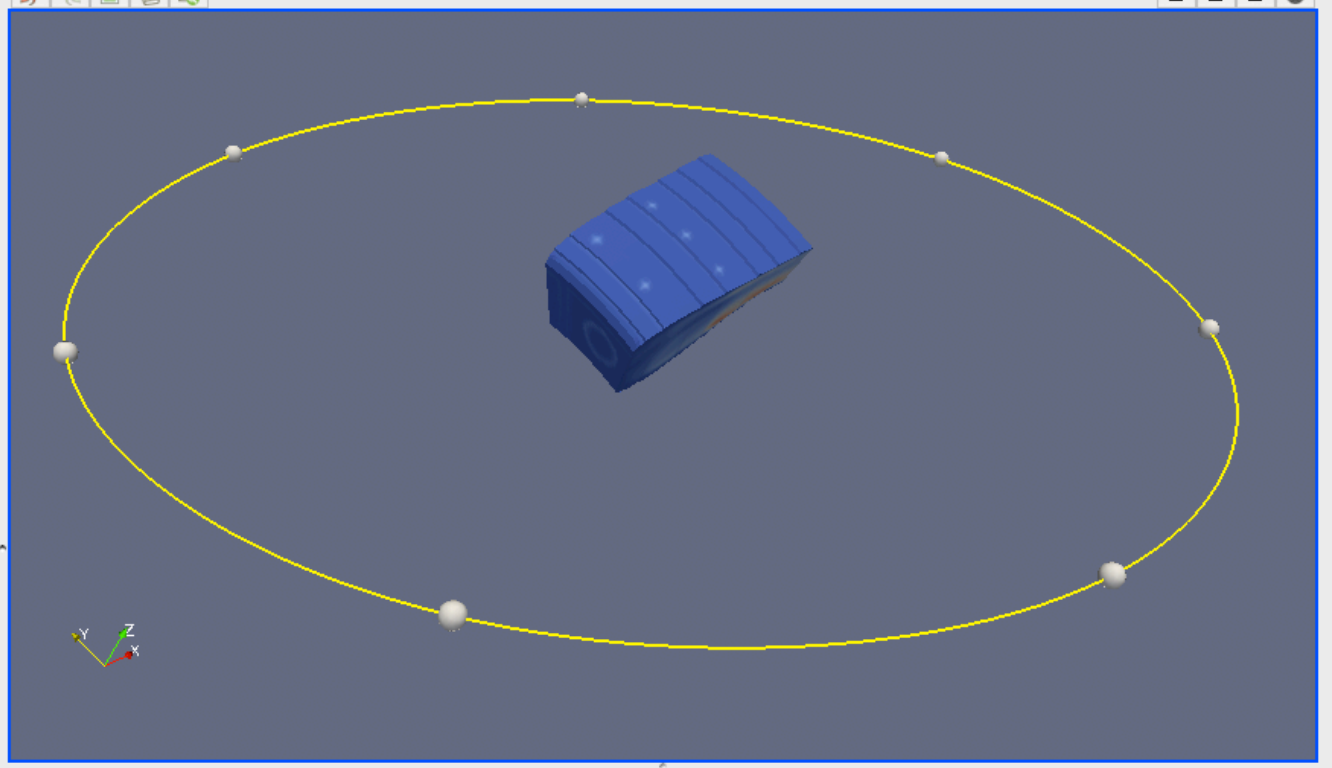
Pipeline Browser

- builtin:
- comb.xyz

Object Inspector

Properties Display Information

Apply Reset Delete

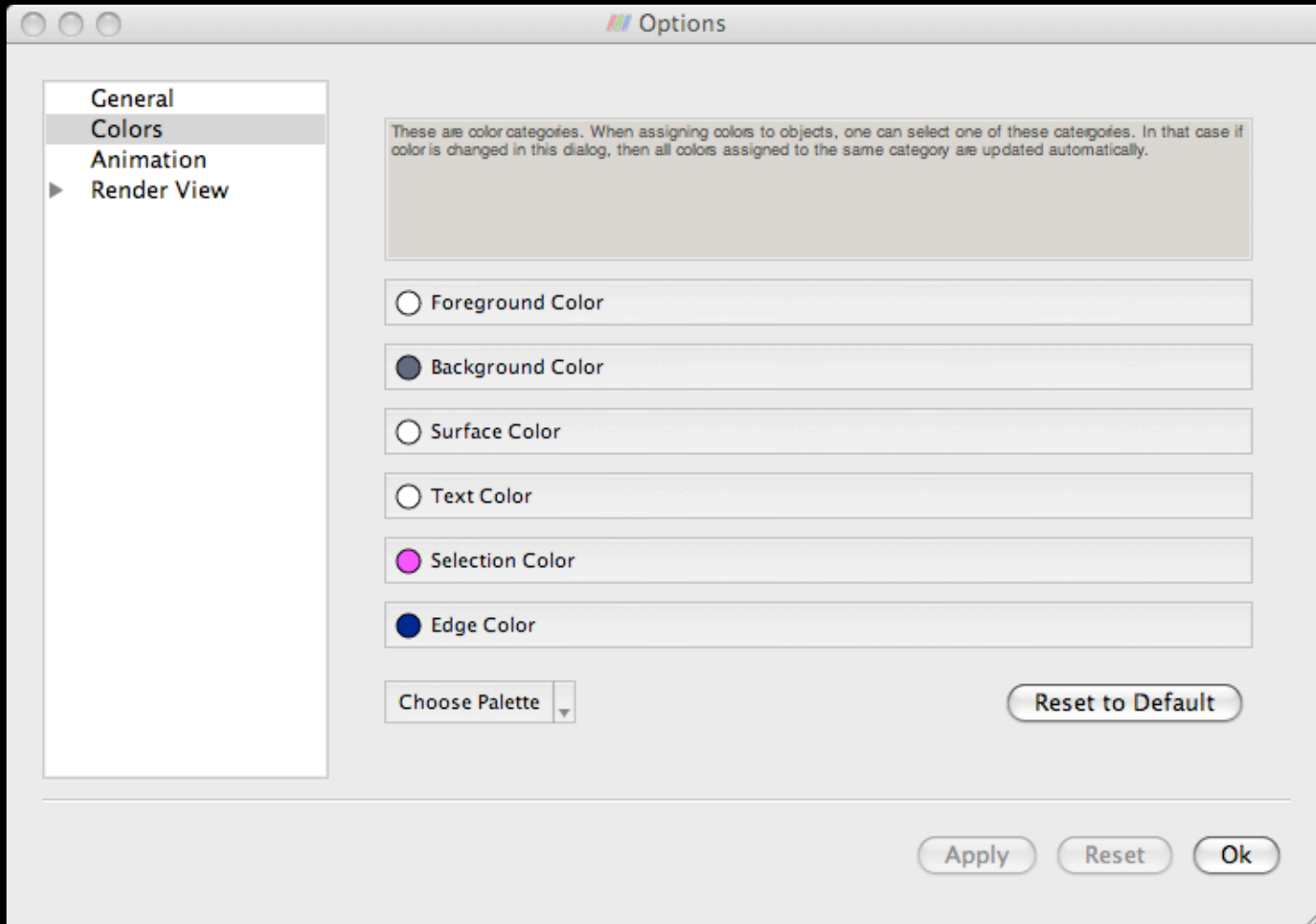


Animation View

Mode: Sequence Time: 0 Start Time: 0 End Time: 1 No. Frames: 10

Time	0.000e+00	2.500e-01	5.000e-01	7.500e-01	1.000e+00
TimeKeeper - Time					
Camera					
Camera	Orbit				

Close button and input field



Time: 0 0

Iterations

+X -X +Y -Y +Z -Z

Pipeline Browser

builtin:
Mandelbrot1

Object Inspector

Properties Display Information

View

Visible Zoom To Data

Selectable

Color

Interpolate Scalars

Map Scalars

Apply Texture None

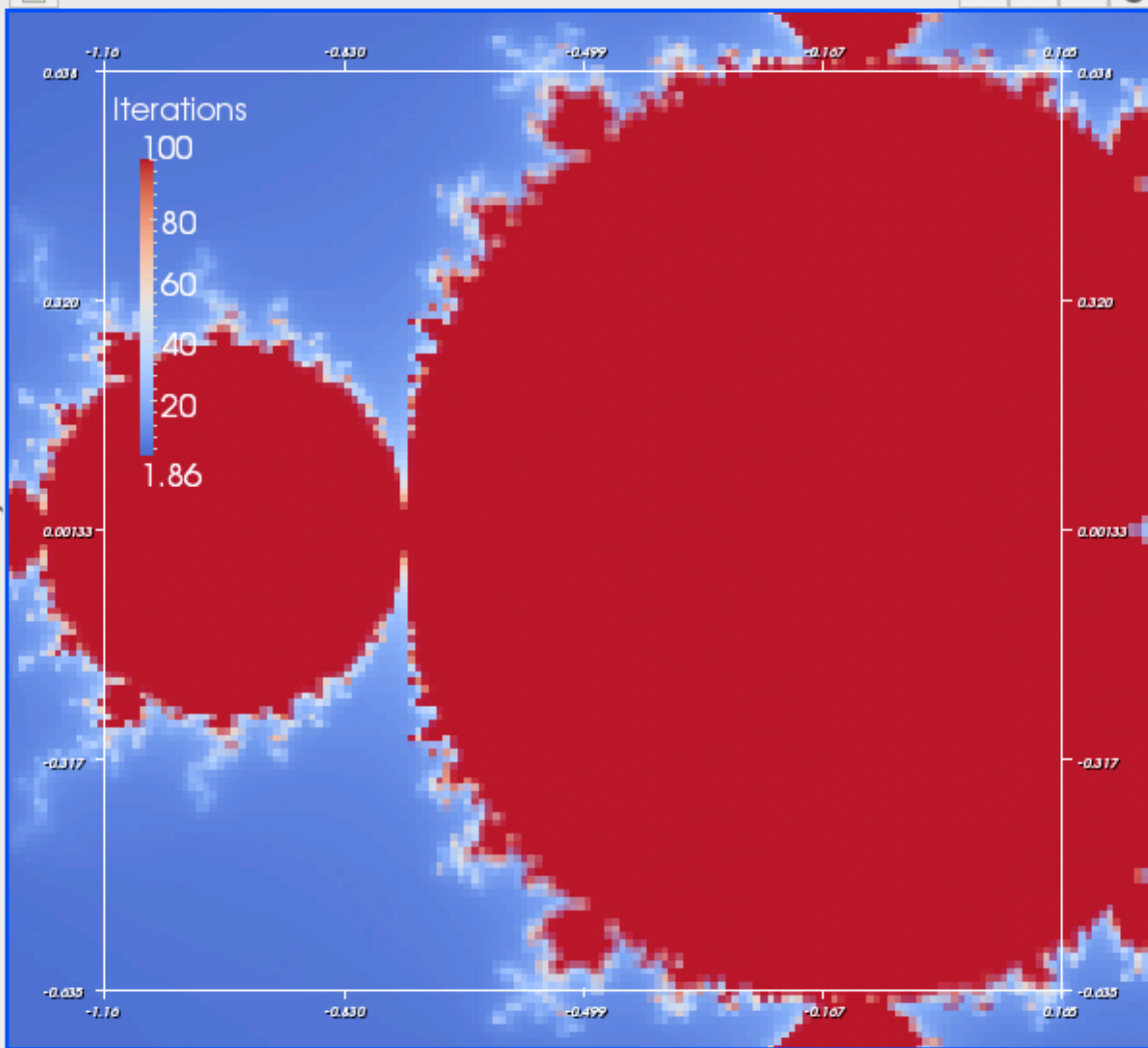
Color by Iterations

Edit Color Map...

Rescale to Data R

Slice

Slice Direction XY Plane



Time: 0 0

MomentumMag

Surface

Pipeline Browser

- builtin:
 - delta-40.vts
 - Calculator1
 - Threshold2
 - AppendDatasets1
 - Threshold3**
 - AppendDatasets1

Object Inspector

Properties Display Information

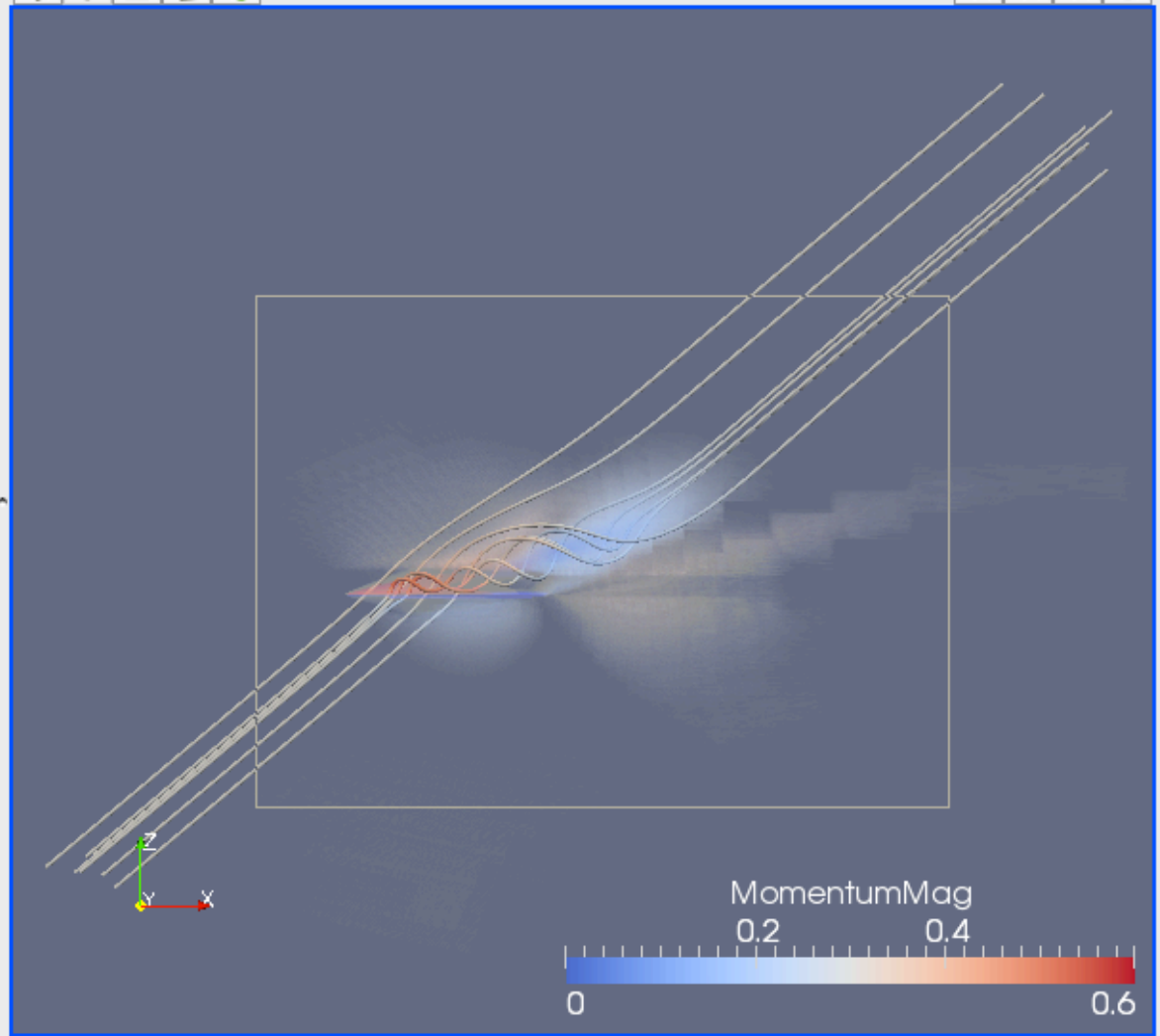
Apply Reset Delete ?

Scalars MomentumMag

Lower Threshold 0

Upper Threshold .299

All Scalars



Close button and empty input field

Time: 0 0

MomentumMag Surface

+X +Y +Z -X -Y -Z

Pipeline Browser

- builtin:
 - delta-40.vts
 - Calculator1
 - Threshold2
 - AppendDatasets1
 - Threshold3**
 - AppendDatasets1

Object Inspector

Properties Display Information

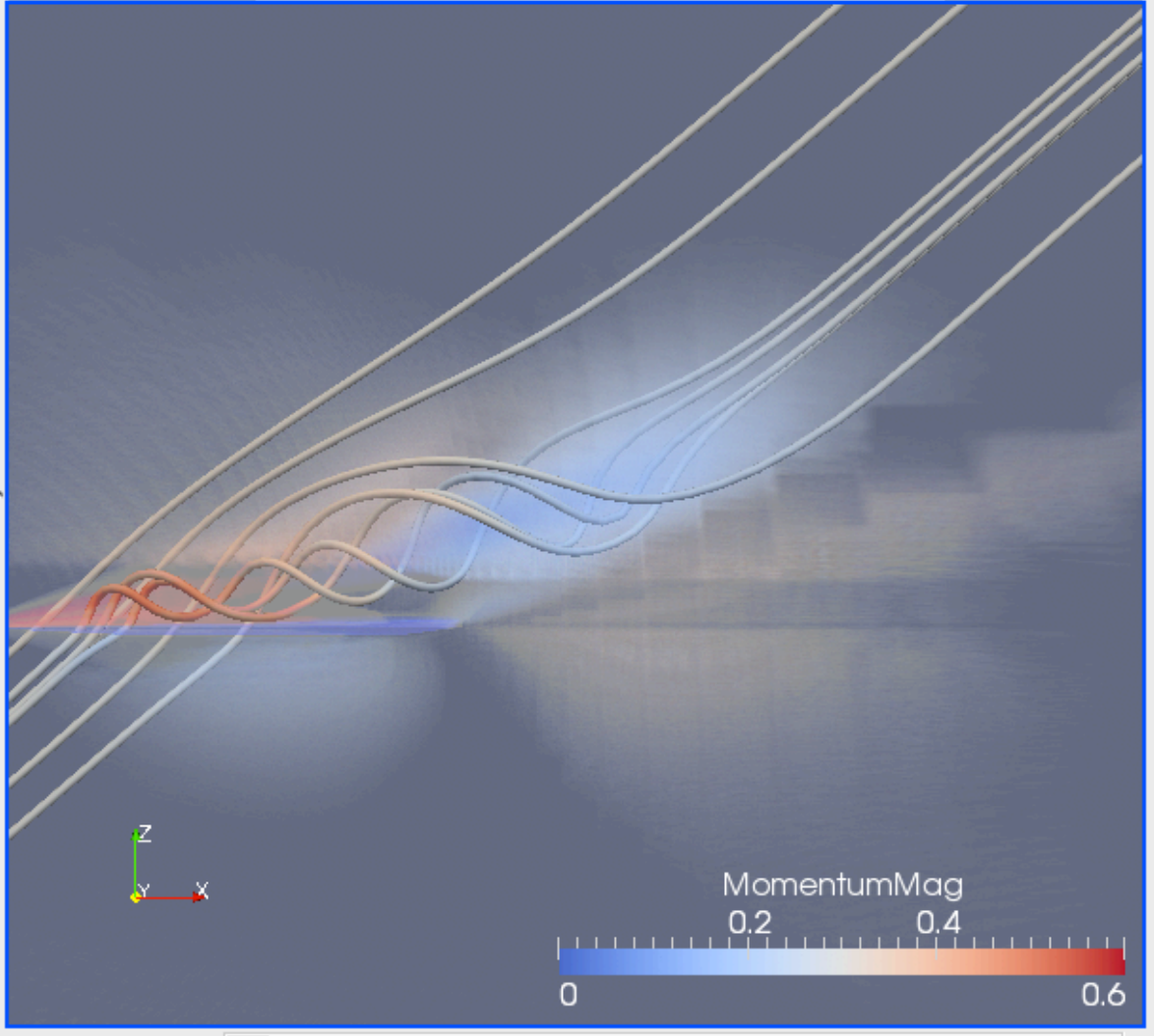
Apply Reset Delete ?

Scalars MomentumMag

Lower Threshold 0

Upper Threshold .299

All Scalars



Time: 0 0

Density Surface

+X -X +Y -Y +Z -Z

Pipeline Browser

- builtin:
- comb.xyz
- StreamTracer2

Object Inspector

Properties Display Information

Apply Reset Delete ?

Seeds

Seed Type

Line Source

Show Line

Point1 8.2550001 -6.794569 29.763084

Point2 8.2550001 6.7945690 29.763084

X Axis

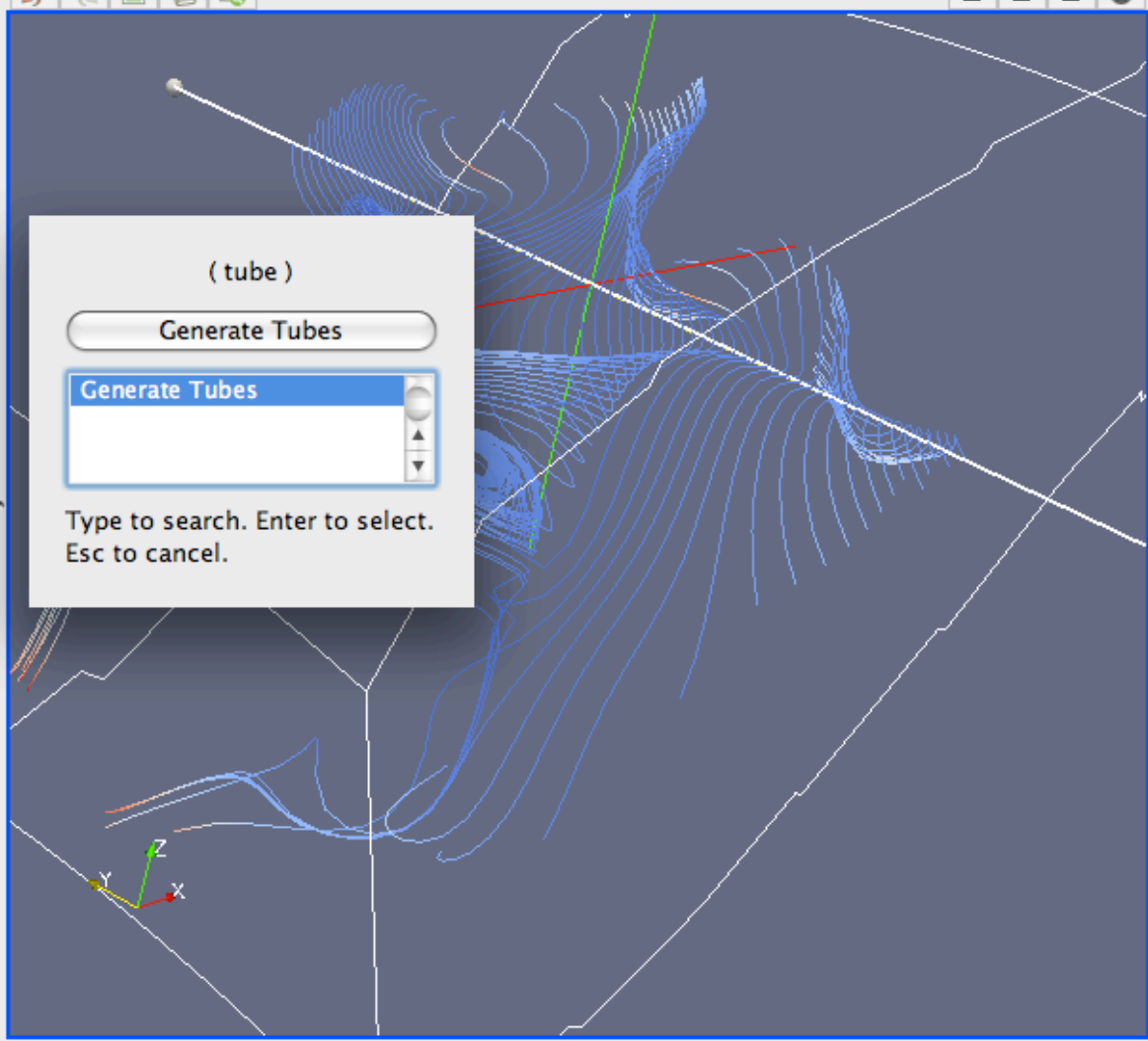
Y Axis

Z Axis

Resolution

100

Note: Move mouse and use 'P' key to



(tube)

Generate Tubes

Generate Tubes

Type to search. Enter to select.
Esc to cancel.



Experimental Features

- **VisIt Database Bridge**
- **StreamingParaView**
- **OverView**

