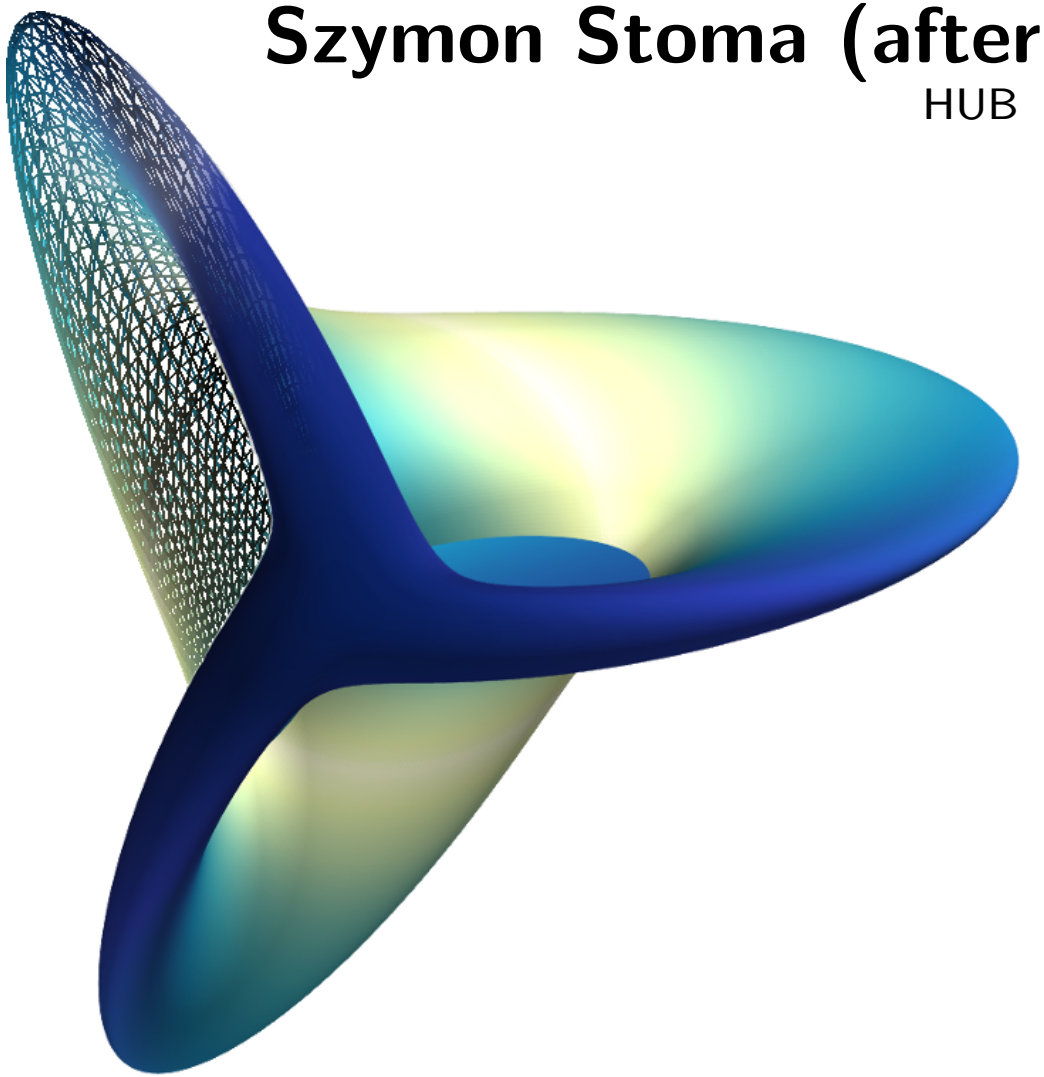
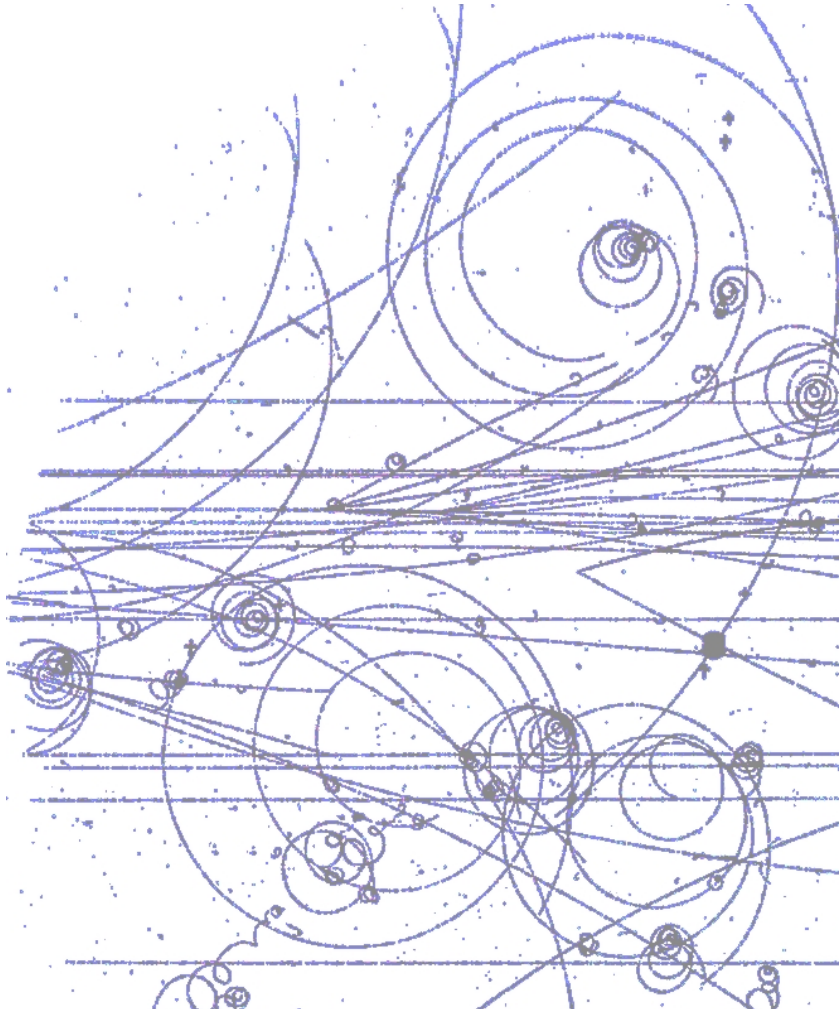
Introduction to Mayavi2

Szymon Stoma (after Gaël Varoquaux)
HUB





1. **Data source, filters, and visualization modules**

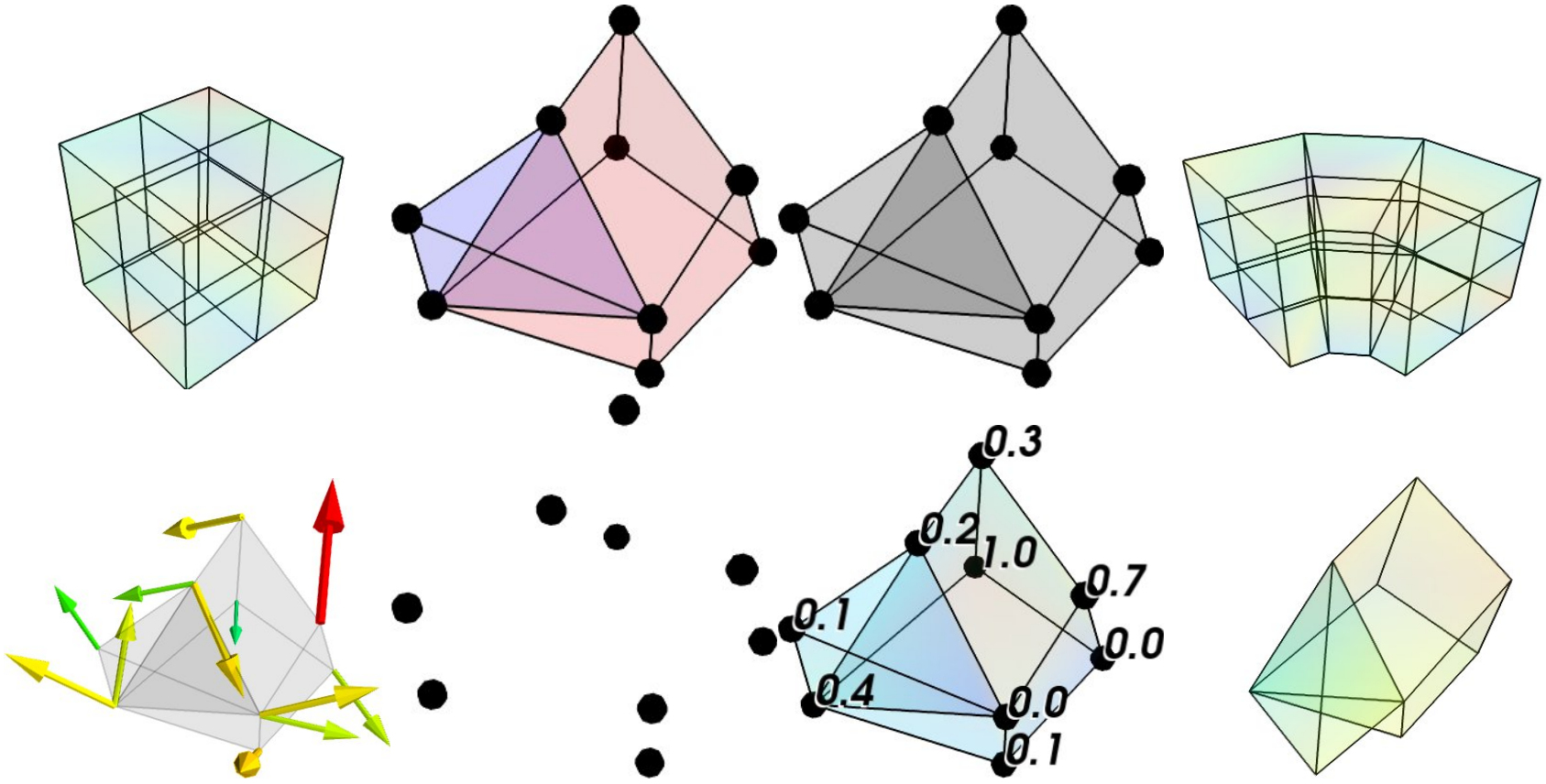
2. **A component model**

3. **The `mlab_source` attribute**

Data source, filters, and visualization modules

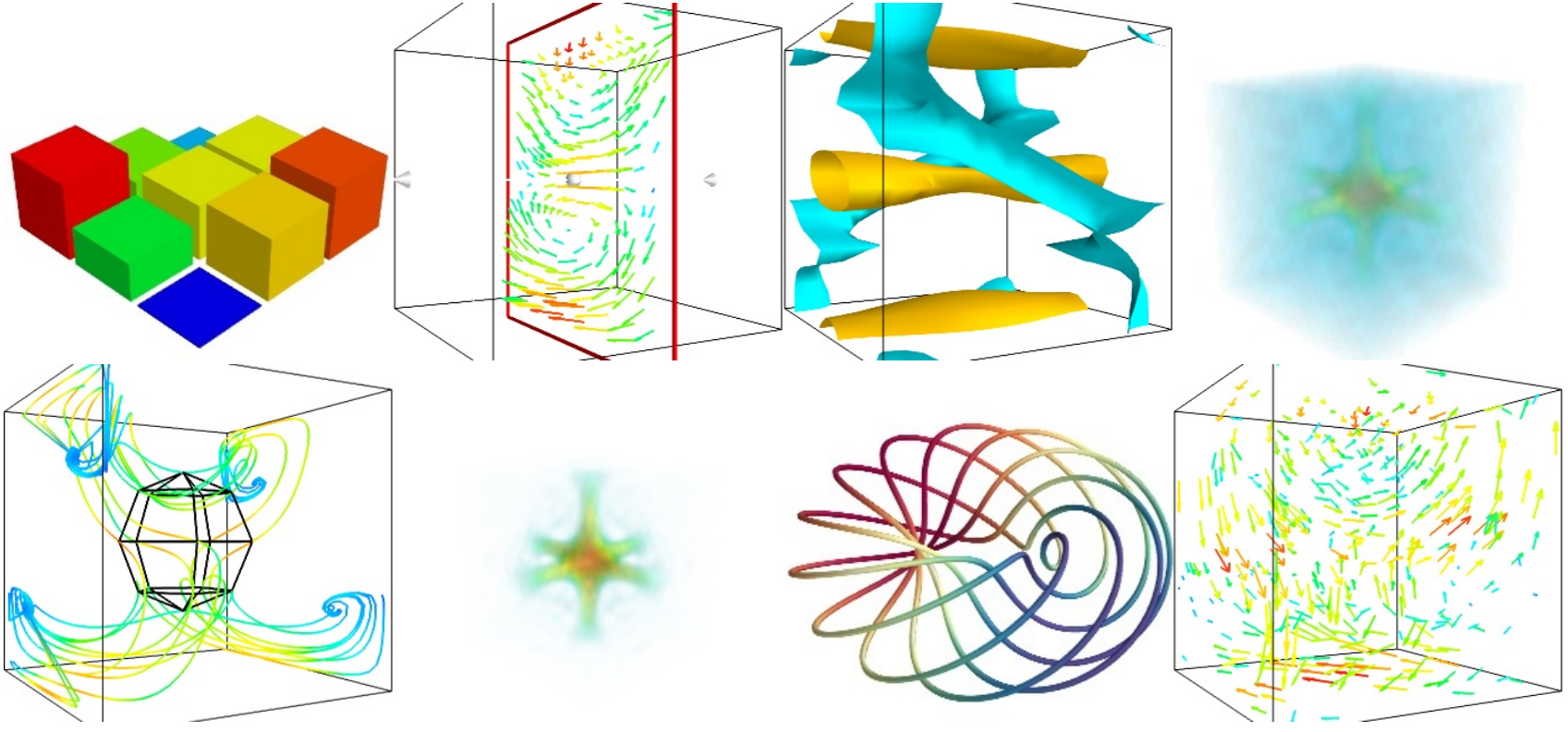
Tell me what your data looks like

- Connected, or not?
- Regularly sampled or not?
- Vectors, scalars, both?

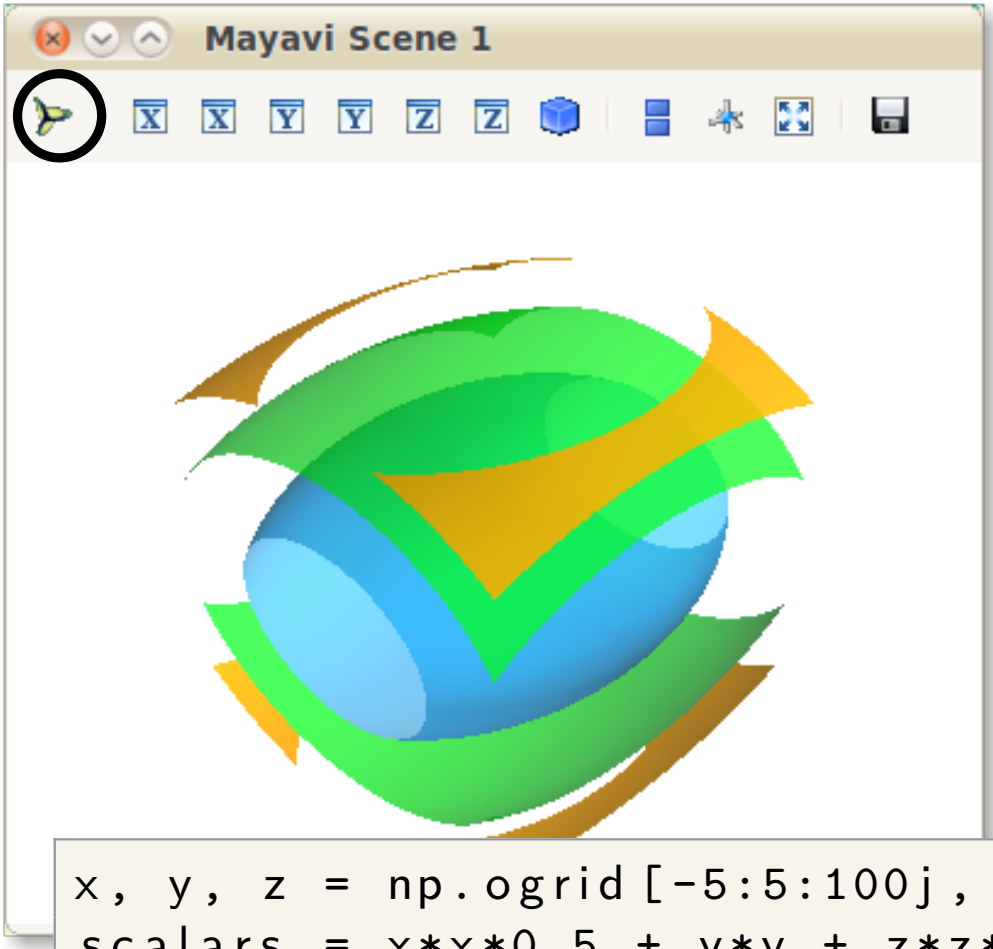


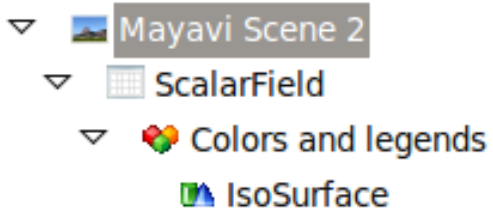
Tell me how you want it represented

- On a plane?
- With arrows, or lines?
- Isosurfaces, or volumetric?



1 mlab: simple scripting

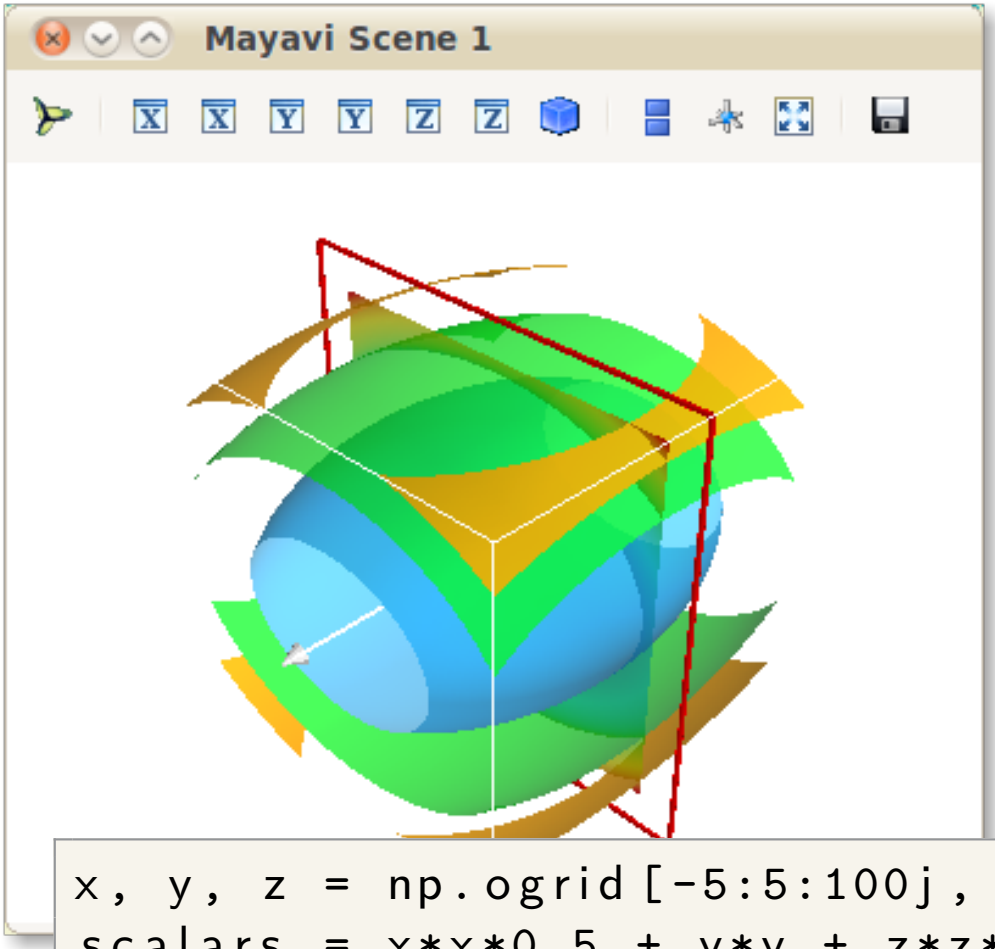




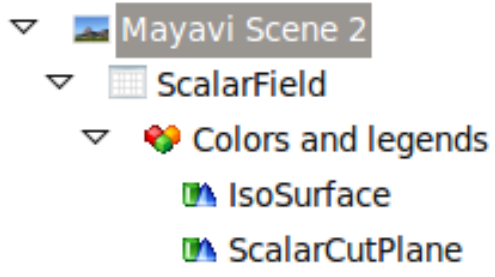
ipython -wthread

```
x, y, z = np.ogrid[-5:5:100j, -5:5:100j, -5:5:100j]
scalars = x*x*0.5 + y*y + z*z*2.0
from enthought.mayavi import mlab
iso = mlab.contour3d(scalars, transparent=True)
```

1 mlab.pipeline: scripting with power



Adding a cut plane

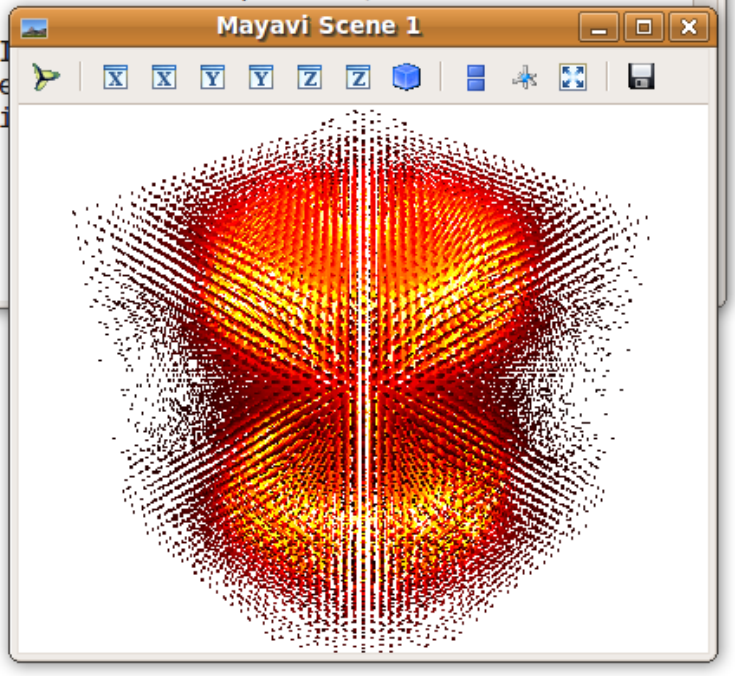



```
x, y, z = np.ogrid[-5:5:100j, -5:5:100j, -5:5:100j]
scalars = x*x*0.5 + y*y + z*z*2.0
from enthought.mayavi import mlab
iso = mlab.contour3d(scalars, transparent=True)

mlab.pipeline.scalar_cut_plane(iso)
```

1 mlab: hands on exercise

varoquau@resting: ~/Projects/Python_talks/EuroScipy

```
resting ~/Projects/Python_talks/EuroScipy $ ipython -wthread -no

In [1]: import numpy as np

In [2]: u, v, w = np.load('field.npy')

In [3]: u.shape, v.shape, w.shape
Out[3]: ((31, 31, 31), (31, 31, 31), (31, 31, 31))

In [4]: from enthought.mayavi import mlab

In [5]: mlab.quiver3d(u, v, w, colormap='hot')

(python:23053): Gtk-CRITI
_REALIZED (widget)' faile
Out[5]: <enthought.mayavi

In [6]:
```

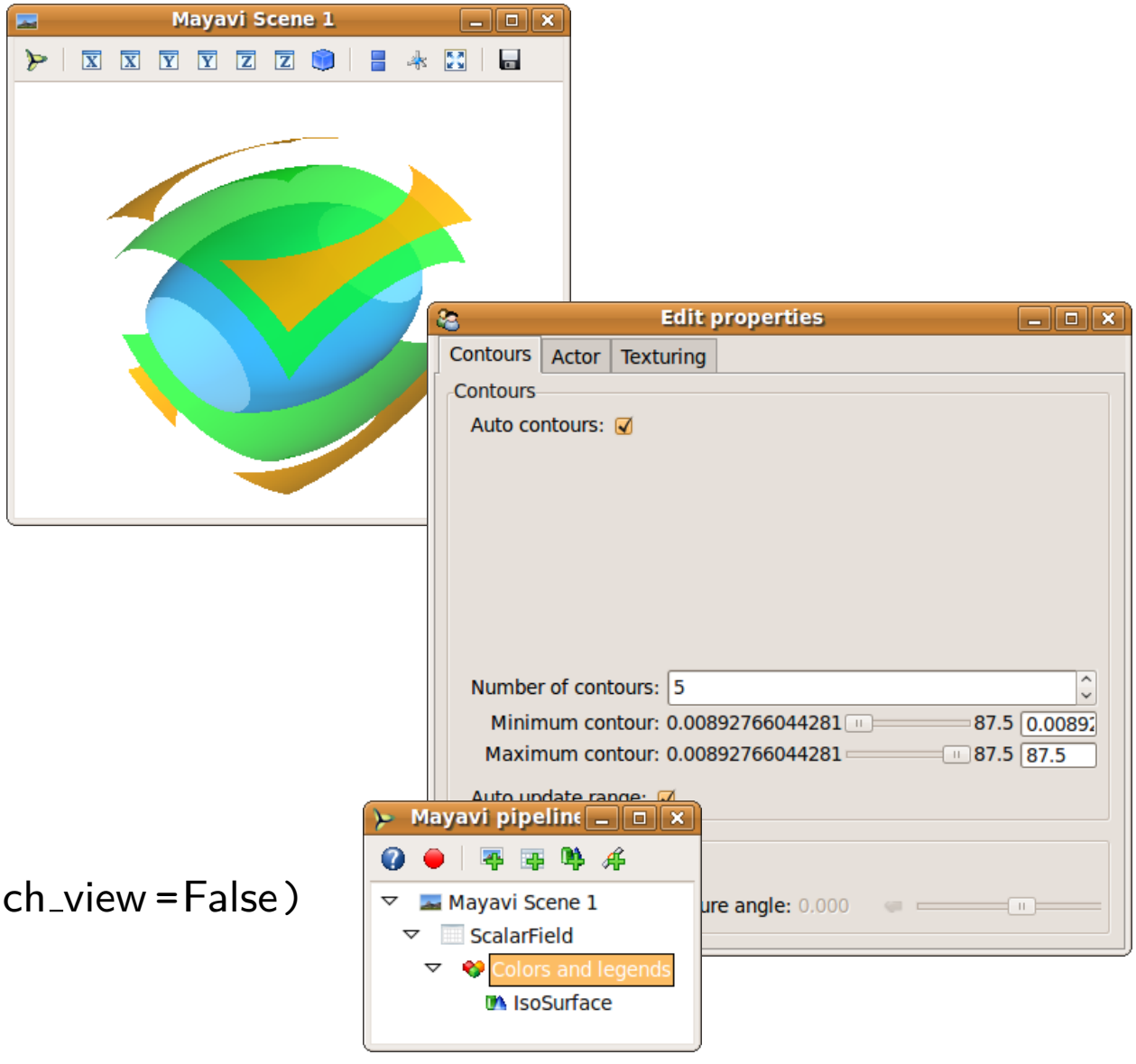


1. 'quiver' visualization
2. Isosurfaces of the intensity
3. Cut plane of the vector field

A component model

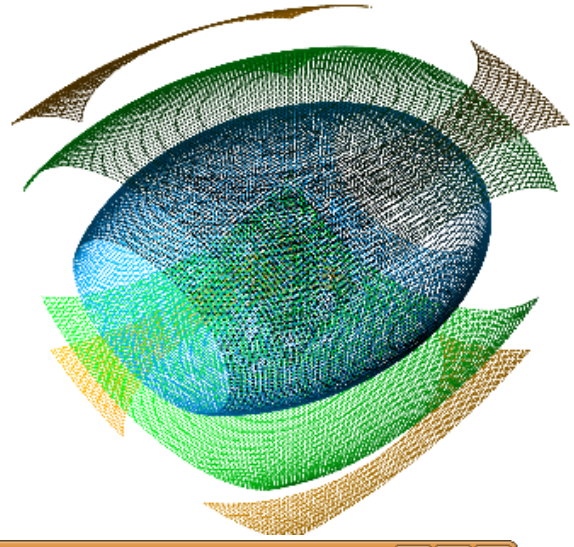
2 A set of live components

- mlab.figure()
- iso.edit_traits()
- mlab.show_pipeline(rich_view=False)



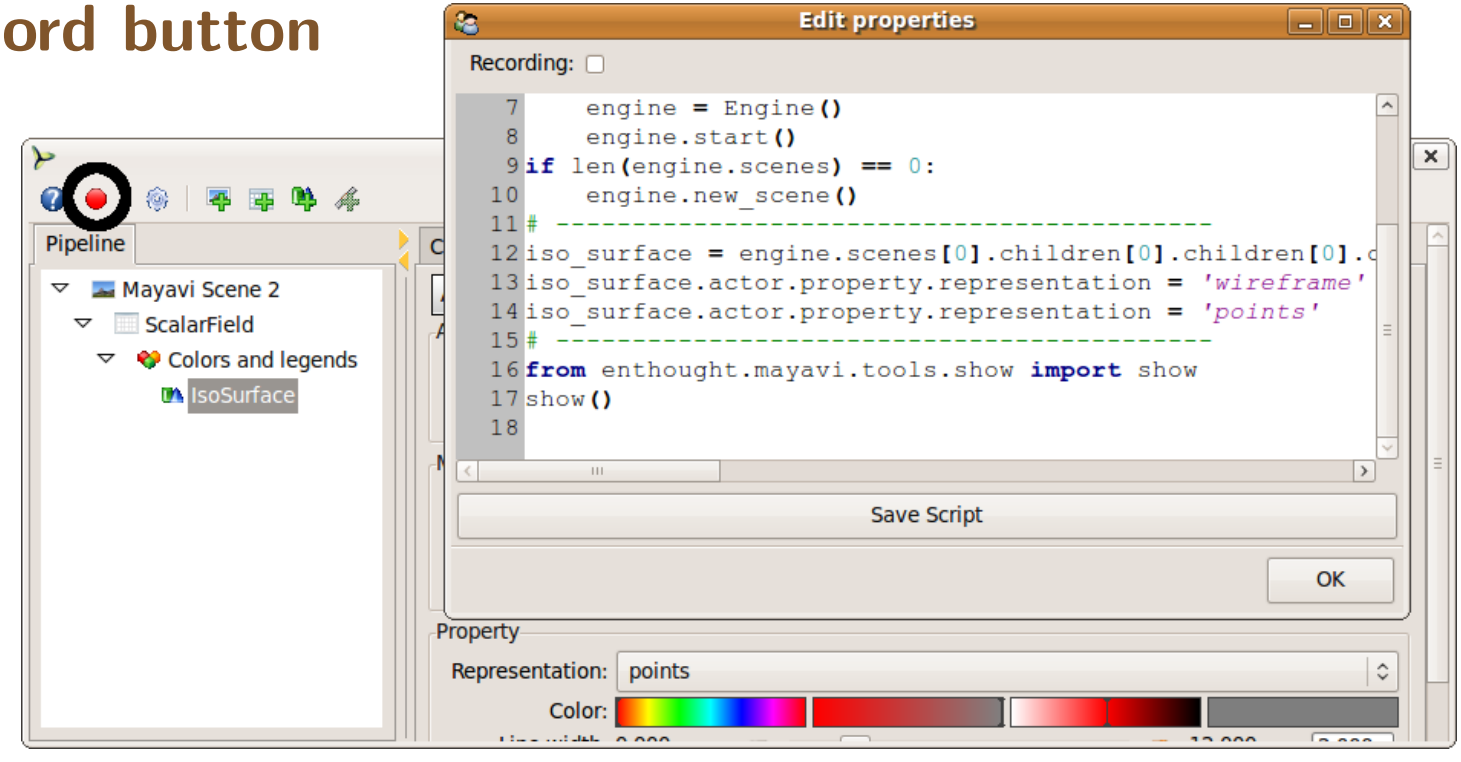
2 Modifying properties

iso . actor . property . representation = 'points'



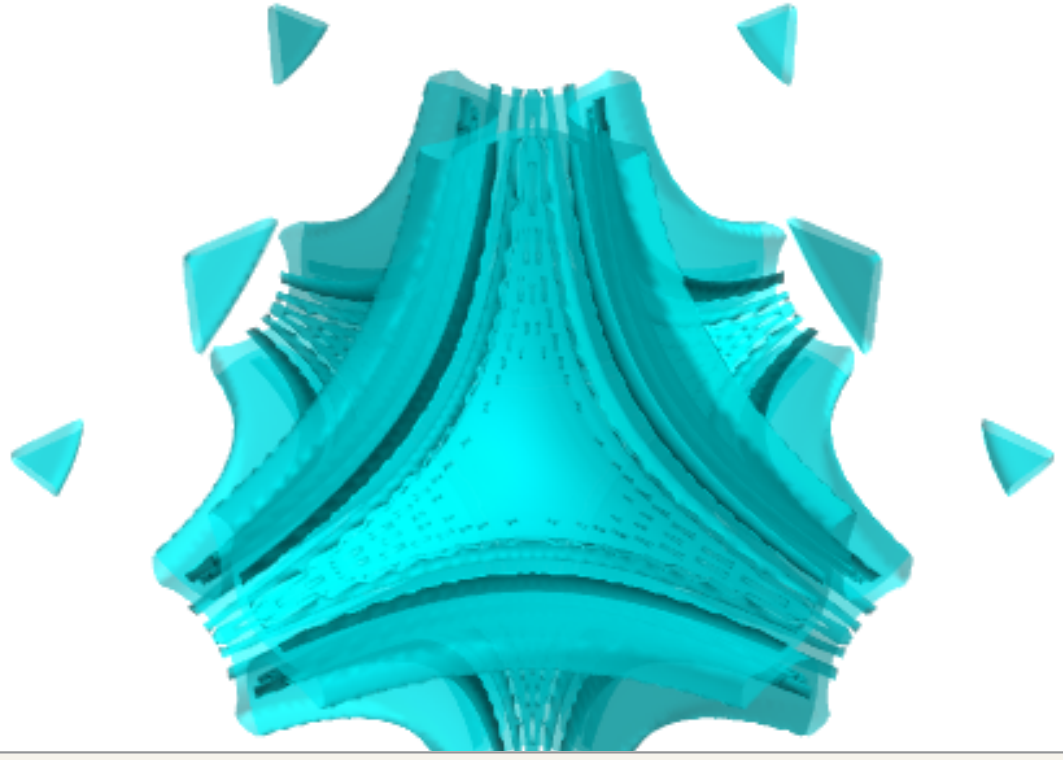
How to find which attributes to modify?

The record button



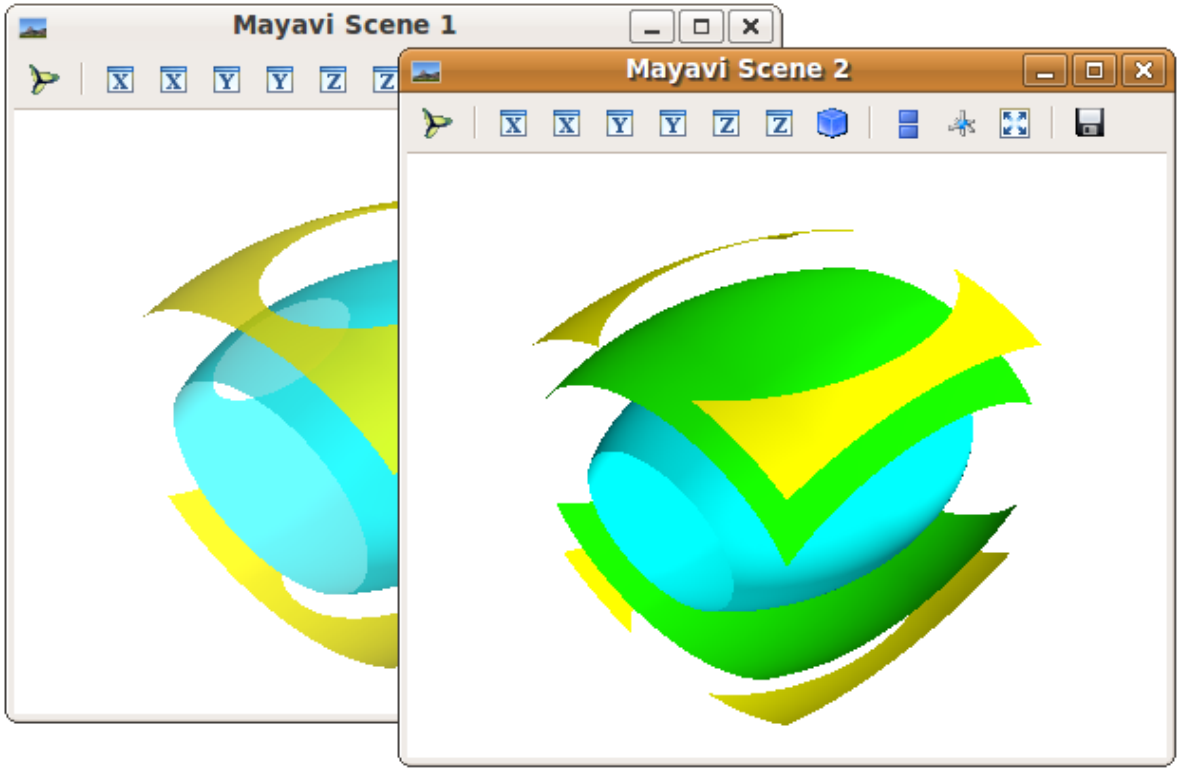
3 The `mlab_source` attribute

3 Modifying data in place



```
x, y, z = np.ogrid[-5:5:100j, -5:5:100j, -5:5:100j]
scalars = np.sin(x*y*z)/(x*y*z)
iso = mlab.contour3d(scalars, transparent=True,
    contours=[0.5])

for i in range(1, 20):
    scalars = np.sin(i*x*y*z)/(x*y*z)
    iso.mlab_source.scalars = scalars
```

3 Trick: sharing data




```
iso = mlab.test_contour3d()

mlab.figure()
iso2 = mlab.pipeline.iso_surface(iso.mlab_source.
    dataset)
```

Mayavi2 authors:

Prabhu Ramachandran Gaël Varoquaux

Presentation credits:

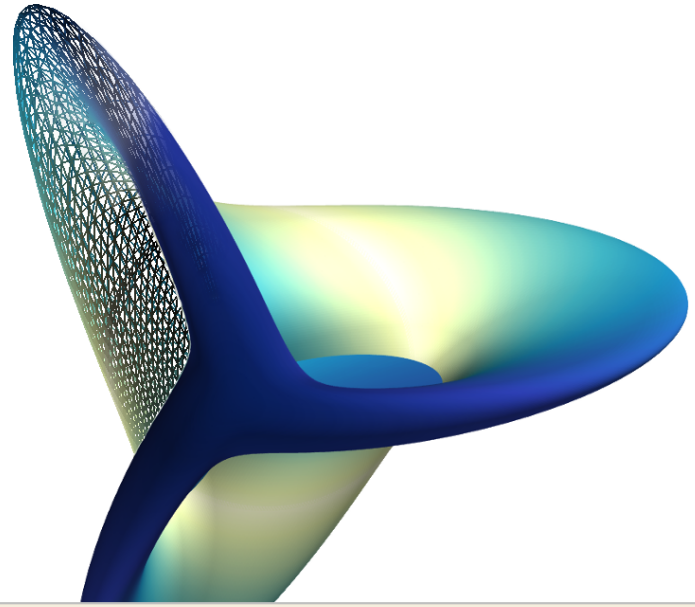
Gaël Varoquaux

I need help:

- Integrating mayavi2 into STSE (http://stse-software.org)
- Adjusting mayavi2 to cell biology
- Constructing mayavi2 based GUI

Conclusion

Mayavi



http://code.enthought.com/projects/mayavi

Very complete documentation