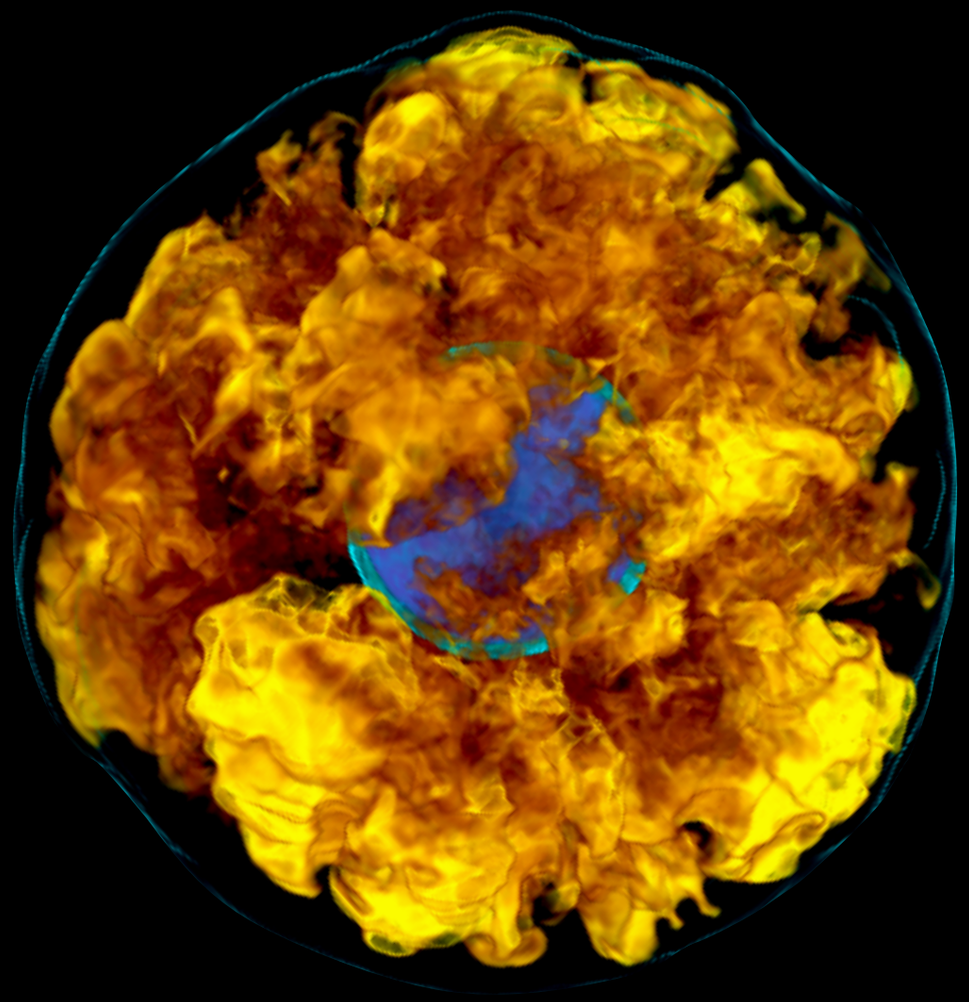
Visualizing FLASH data with yt



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2018 6/4 - 6/6 FLASH bootcamp@MSU

Introduction to yt

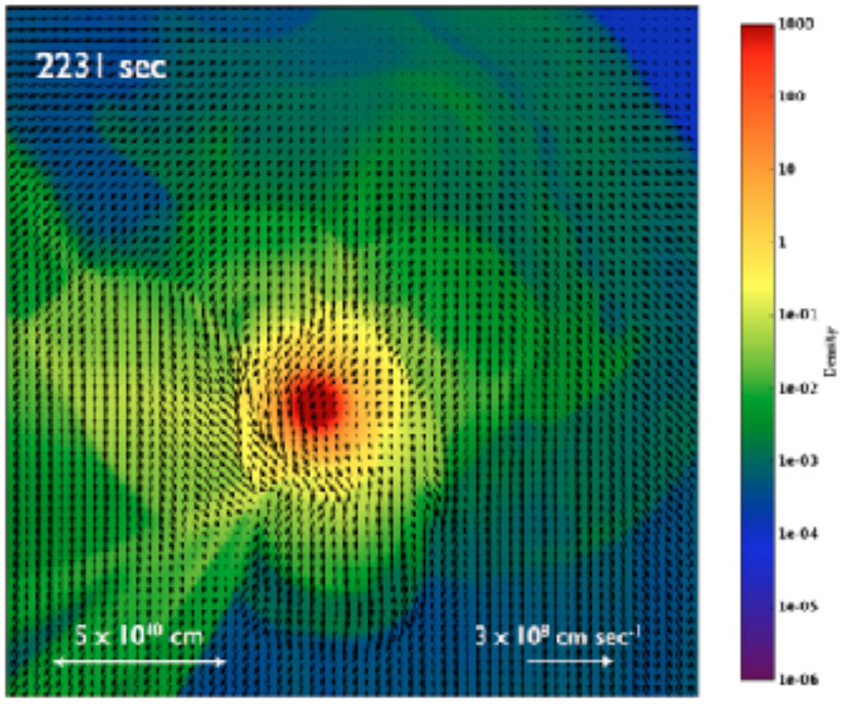
https://yt-project.org

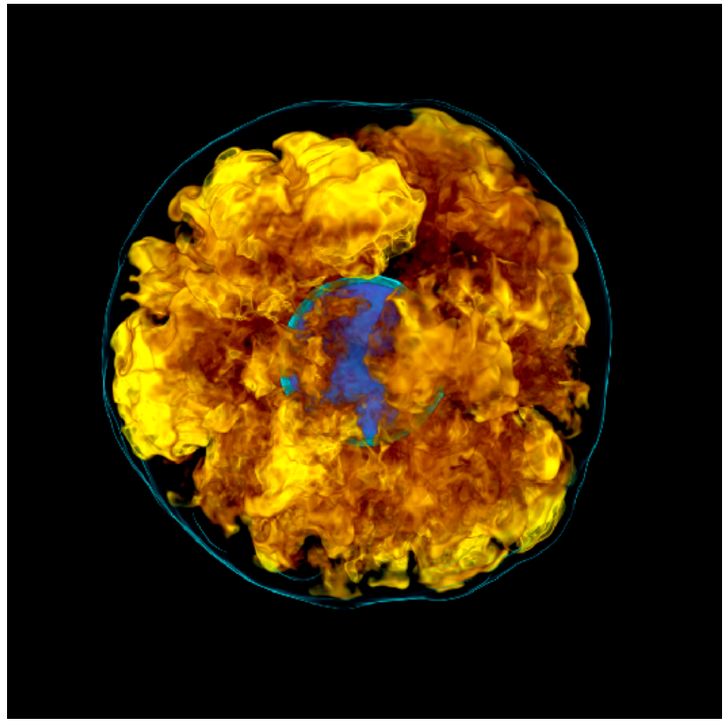
"A picture is worth a thousand words"

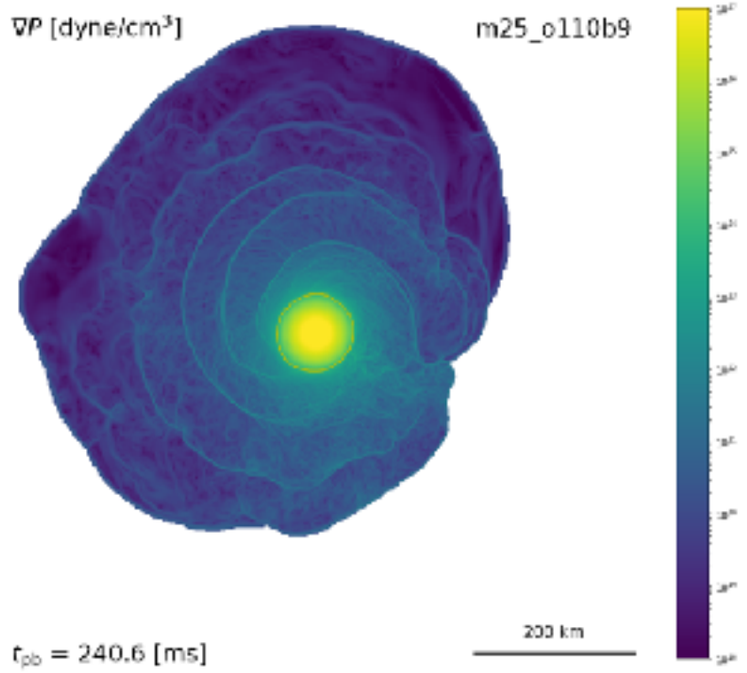
- **yt is written almost entirely in python.**
- **yt is an open source project (on Github)**
- **yt is an analysis toolkit operating on multidimensional datasets for a variety of data formats.**
- **Executing and scripting yt**

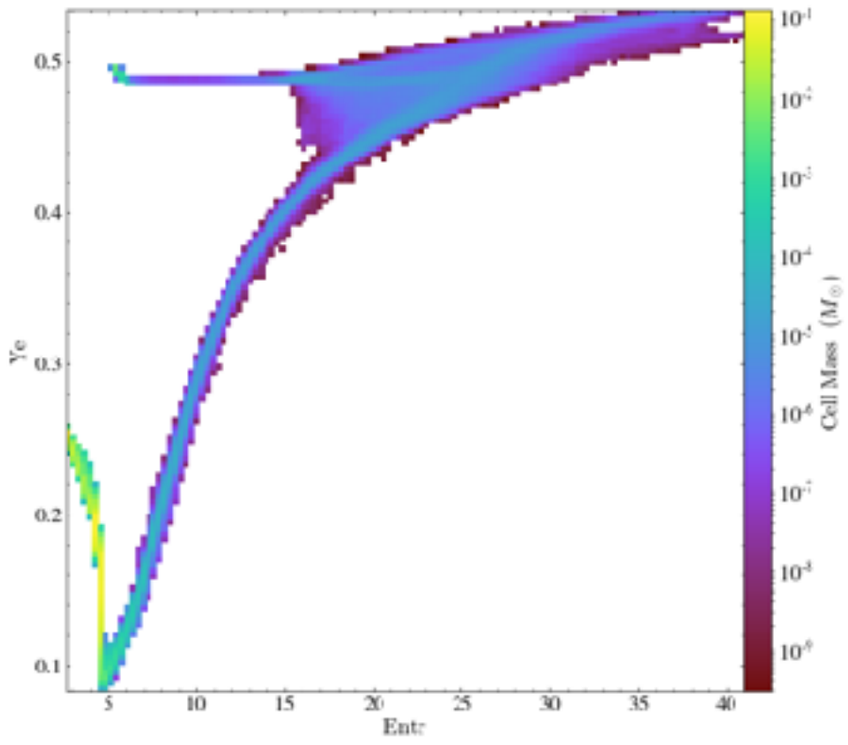
- **Fields: density, temperature, etc. (native and derived fields)**
- **Objects: central to yt's infrastructure are data objects (also called Data Containers) based on field values.**
- **General Analysis**
- **Visualization: slice, projection, rays, volume rendering, etc.**

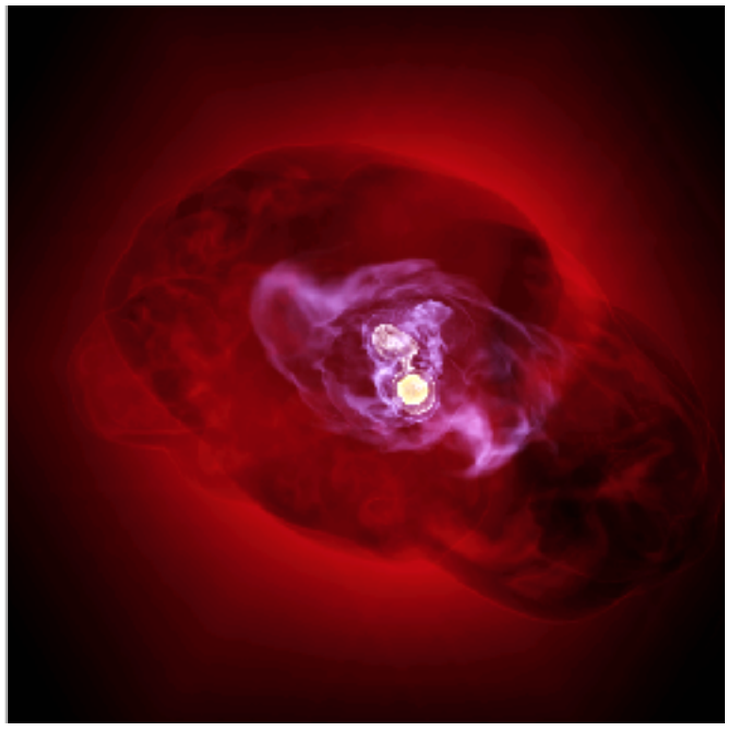
Gallery

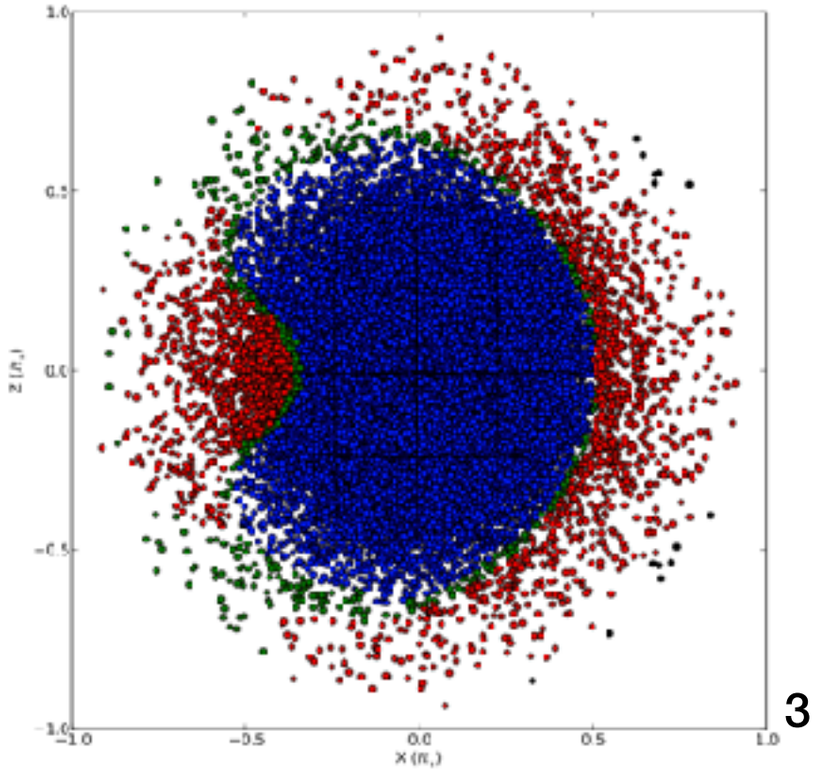

223 sec
5 x 10^10 cm
3 x 10^8 cm sec^-1
Density




∇P [dyne/cm³]
m25_o110b9
200 km
t_pb = 240.6 [ms]


Ye
Entr
Cell Mass (M⊙)




z (r_s)
x (r_s)

Installation

https://yt-project.org/docs/dev/installing.html

- **All-in-one script:**

```
$ wget https://raw.githubusercontent.com/yt-project/yt/master/doc/install_script.sh
$ bash install_script.sh
```

- **Using conda:** *Recommend*

```
$ conda install -c conda-forge yt
$ conda install -c http://use.yt/with_conda yt
```

- **From source:** *Recommend*

```
$ git clone https://github.com/yt-project/yt
$ cd yt
$ python setup.py develop
```

Examples

https://github.com/kuochuanpan/yt-tutorial

- **Example scripts and notebooks**

```
git clone git@github.com:kuochuanpan/yt-tutorial.git
```

- **Sample FLASH data**

```
Download : https://goo.gl/dSXTs7
```

hands-on

- Calculate the mass of PNS*
- Plot a slice of pressure gradient magnitude
- Calculate the net heating in the gain region*
- Take a look of “/script/volume_rendering.py” and try to make a better volume rendering plot with yt.

* PNS radius is defined at dens=1e11 g/cm^3
* Gain region is defined at a region with dens < 3e10 g/cm^3 and positive heating