UNIVERSITY OF HULL

python™

ThaiPASS 2019

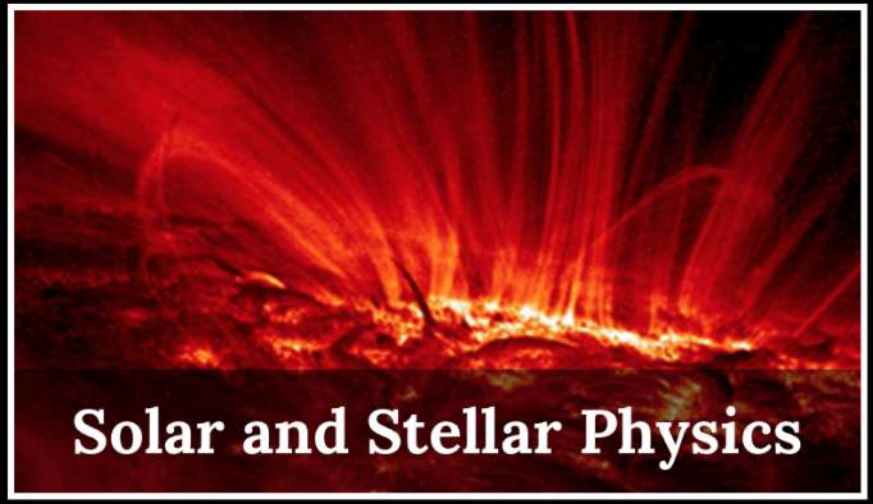
Why we use Python

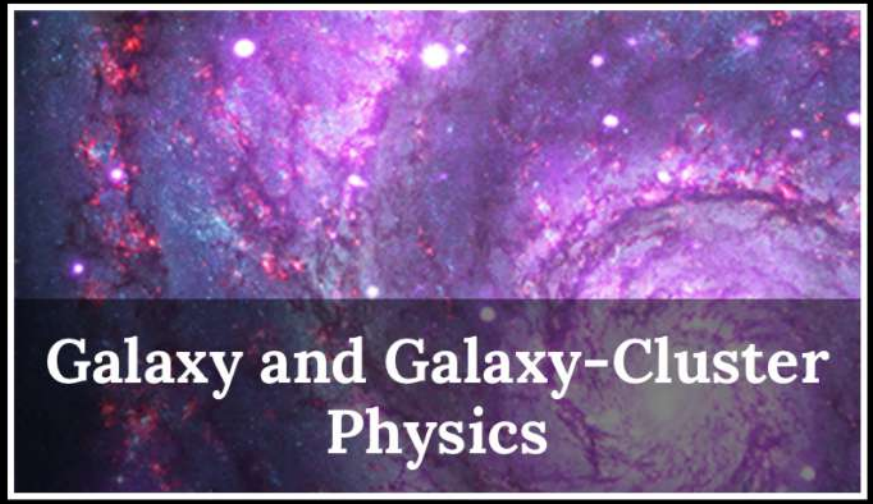
Iraj Vaezzadeh, James Keegans, Mikkel Kristensen

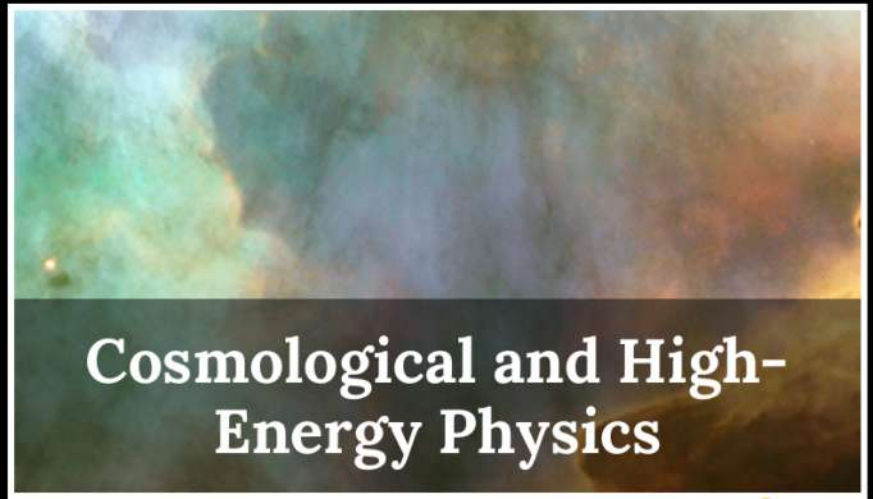
07/10/2019

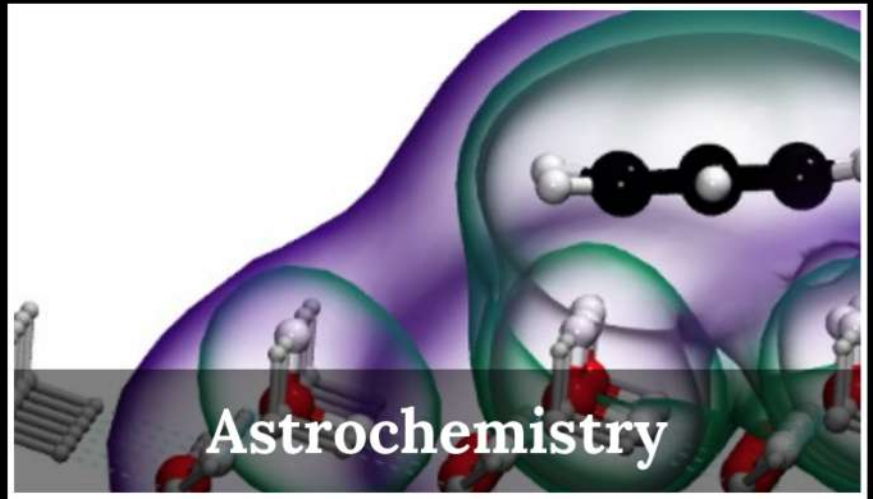
UNIVERSITY OF HULL

Introduction: who are we and what do we do?


Solar and Stellar Physics


Galaxy and Galaxy-Cluster Physics

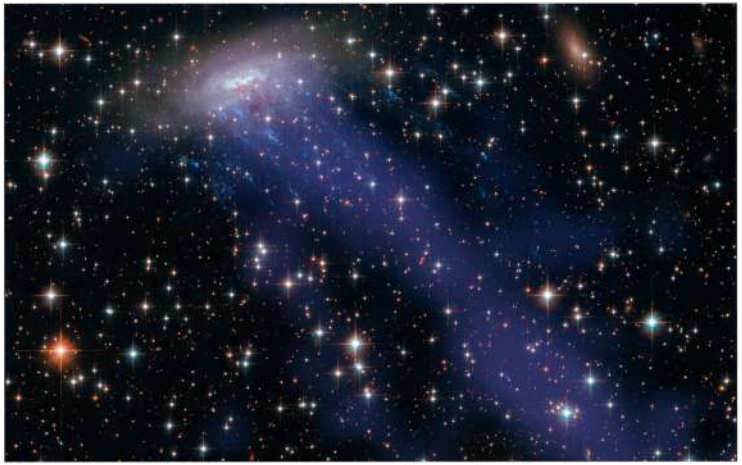

Cosmological and High-Energy Physics


Astrochemistry

UNIVERSITY OF HULL

Mr Mikkel Kristensen

Observational Astronomer -Handles real data from telescopes



Data Handling

For example:

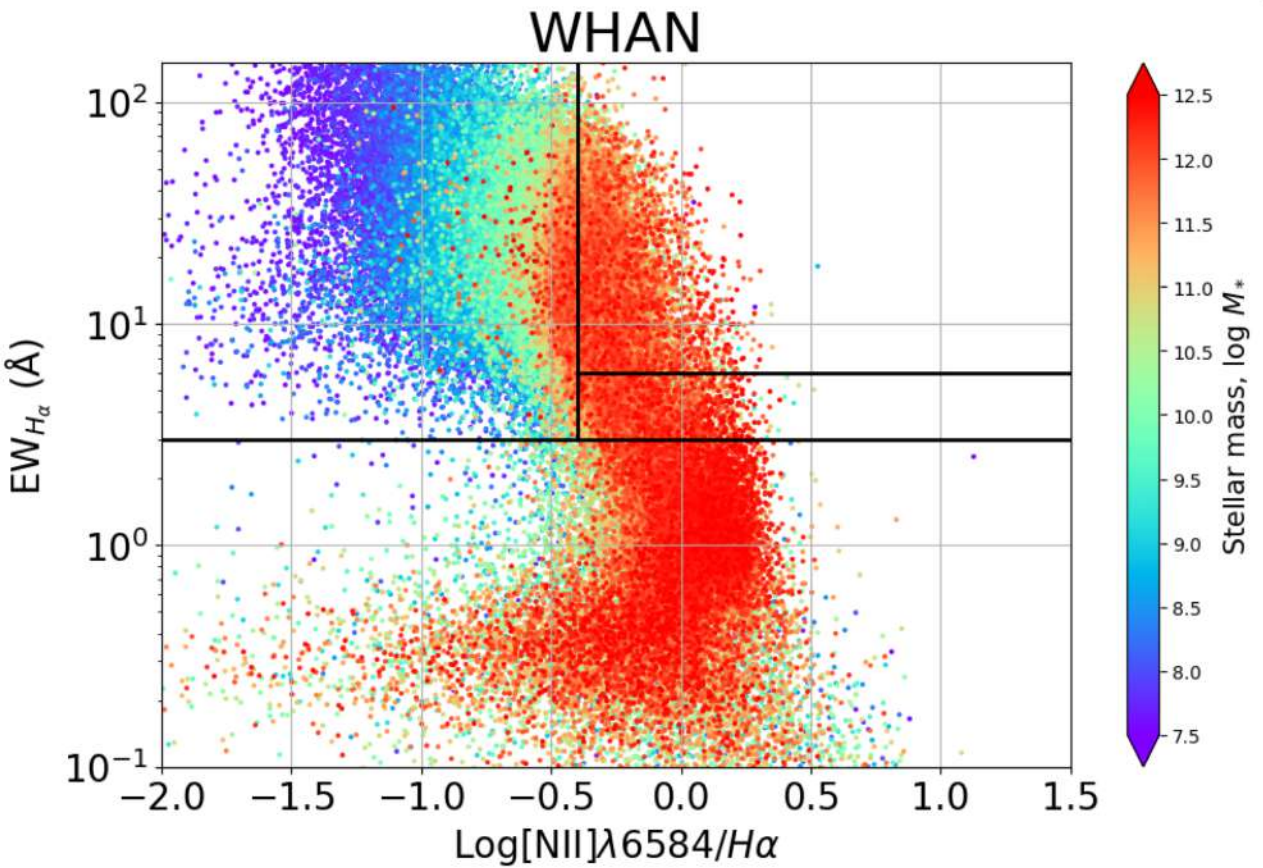
- Cross-Matching -Bringing data together
- Numerical Analysis

Data Visualisation

Allows to present the results of the data handling above (basically, make pretty looking plots/diagrams).

UNIVERSITY OF HULL

Mr Mikkel Kristensen



UNIVERSITY OF HULL

Mr Iraj Vaezzadeh

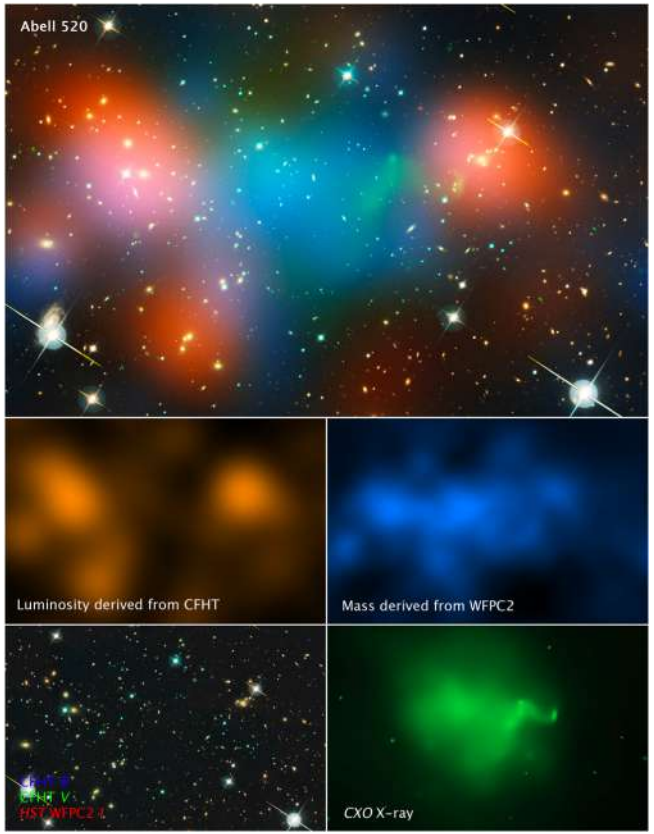
Computational theoretical astrophysicist

Research

I perform hydrodynamical/N-body simulations of galaxy cluster mergers

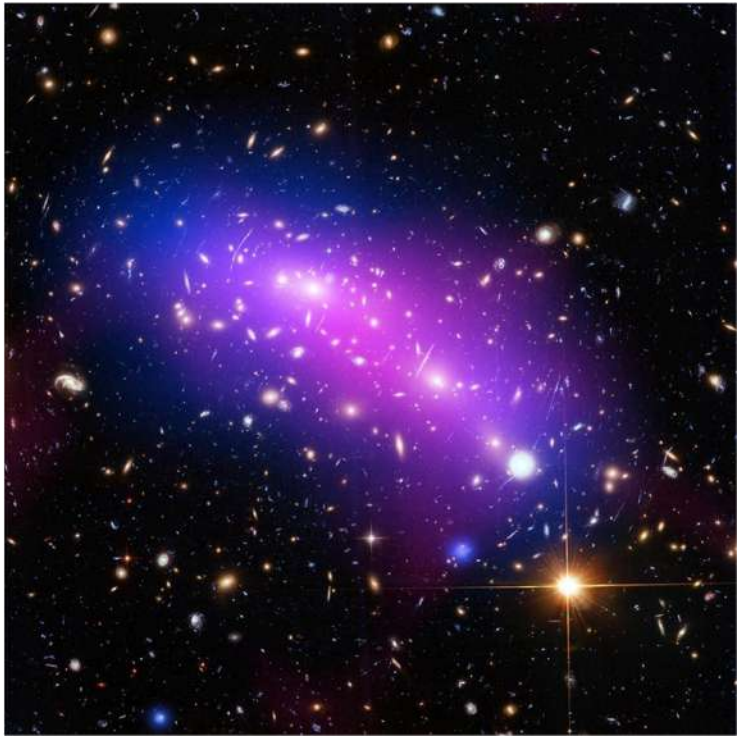
Data Visualisation

I use python to visualise, analyse and perform diagnostics on data from my simulations.



UNIVERSITY OF HULL

Mr Iraj Vaezzadeh



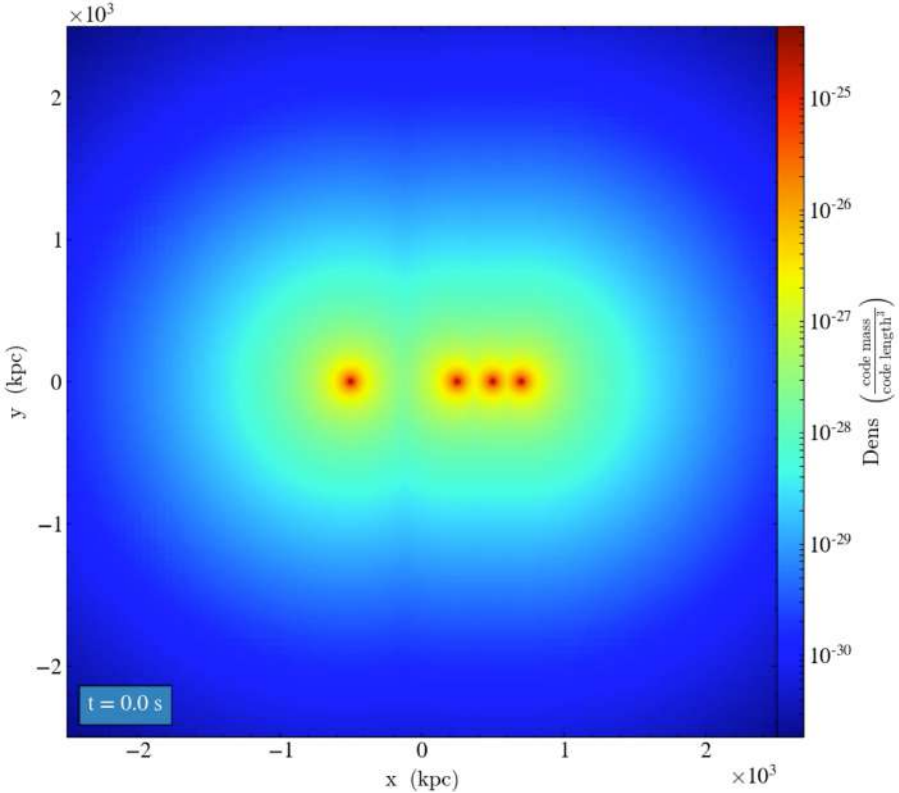
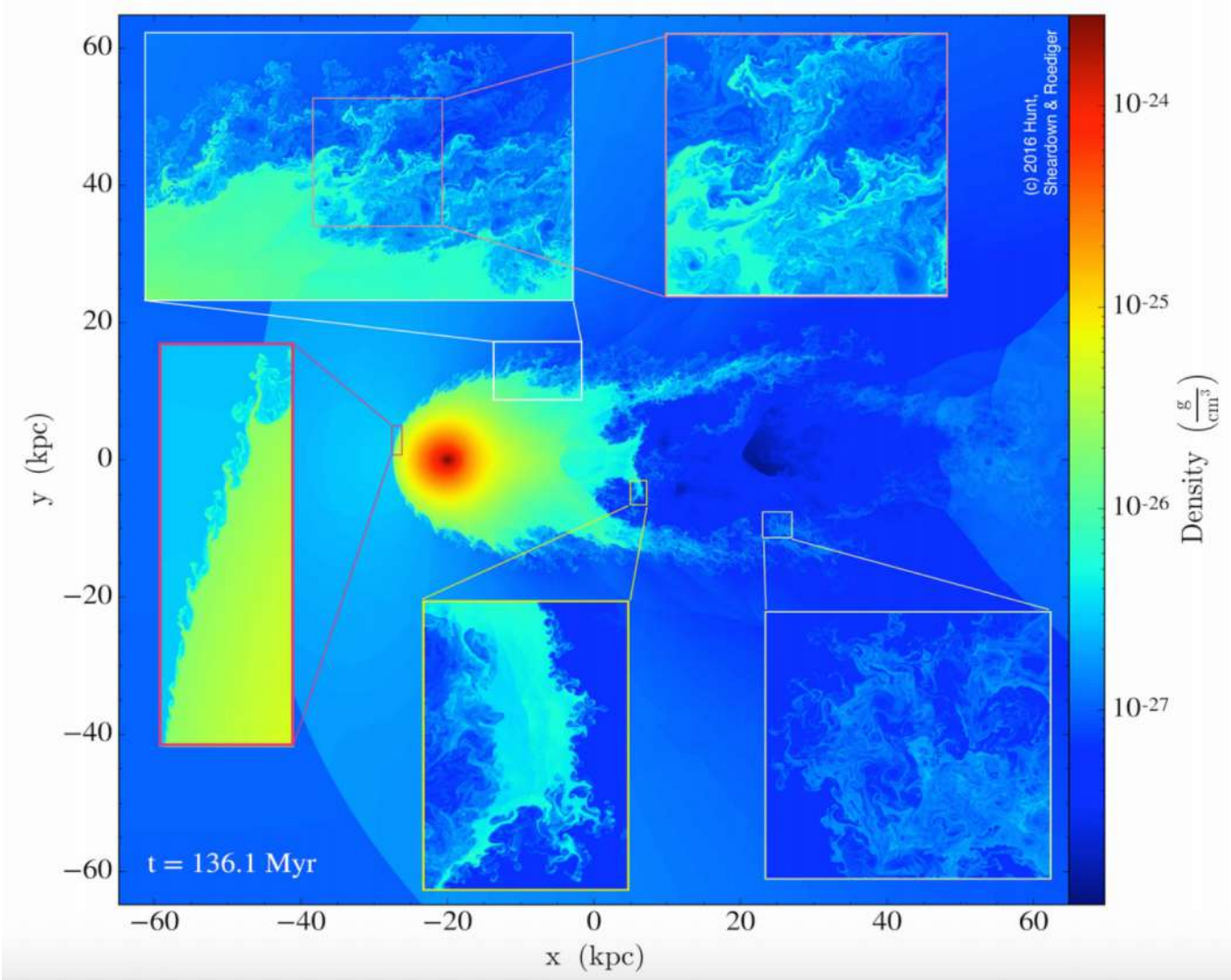


Image credit: X-ray: NASA/CXC/CfA/M.Markevitch et al.; Lensing Map: NASA/STScI; ESO WFI; Magellan/U.Arizona/D.Clowe et al.; Optical: NASA/STScI; Magellan/U.Arizona/D.Clowe et al.Composite from Ethan Siegel Medium.com

UNIVERSITY
OF HULL

Mr Iraj Vaezzadeh

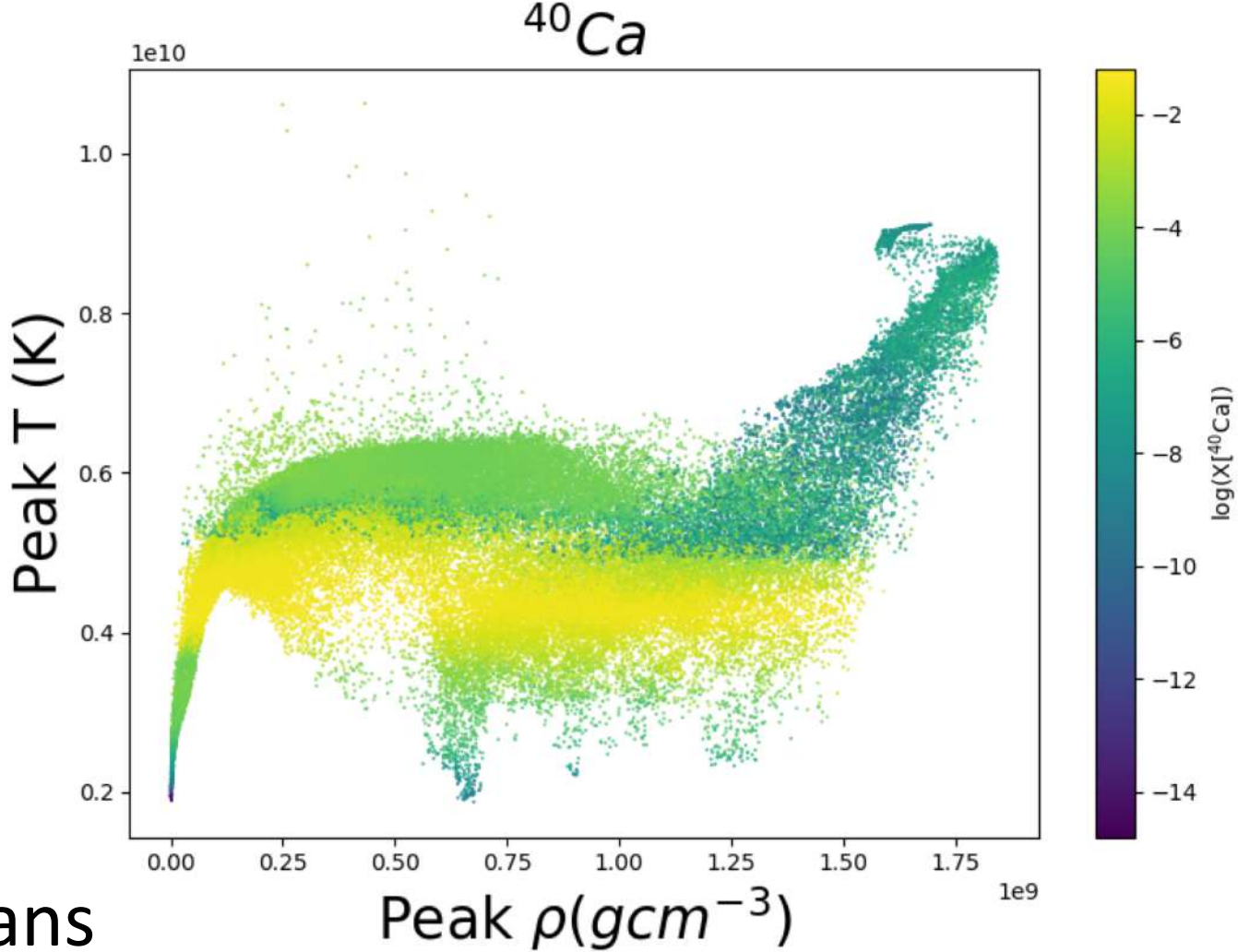


UNIVERSITY OF HULL

This plot shows the distribution of ^{40}Ca in a model of a type Ia supernova.

The most abundant isotope of calcium.

This shows where in the star ^{40}Ca is produced by Temperature and Density



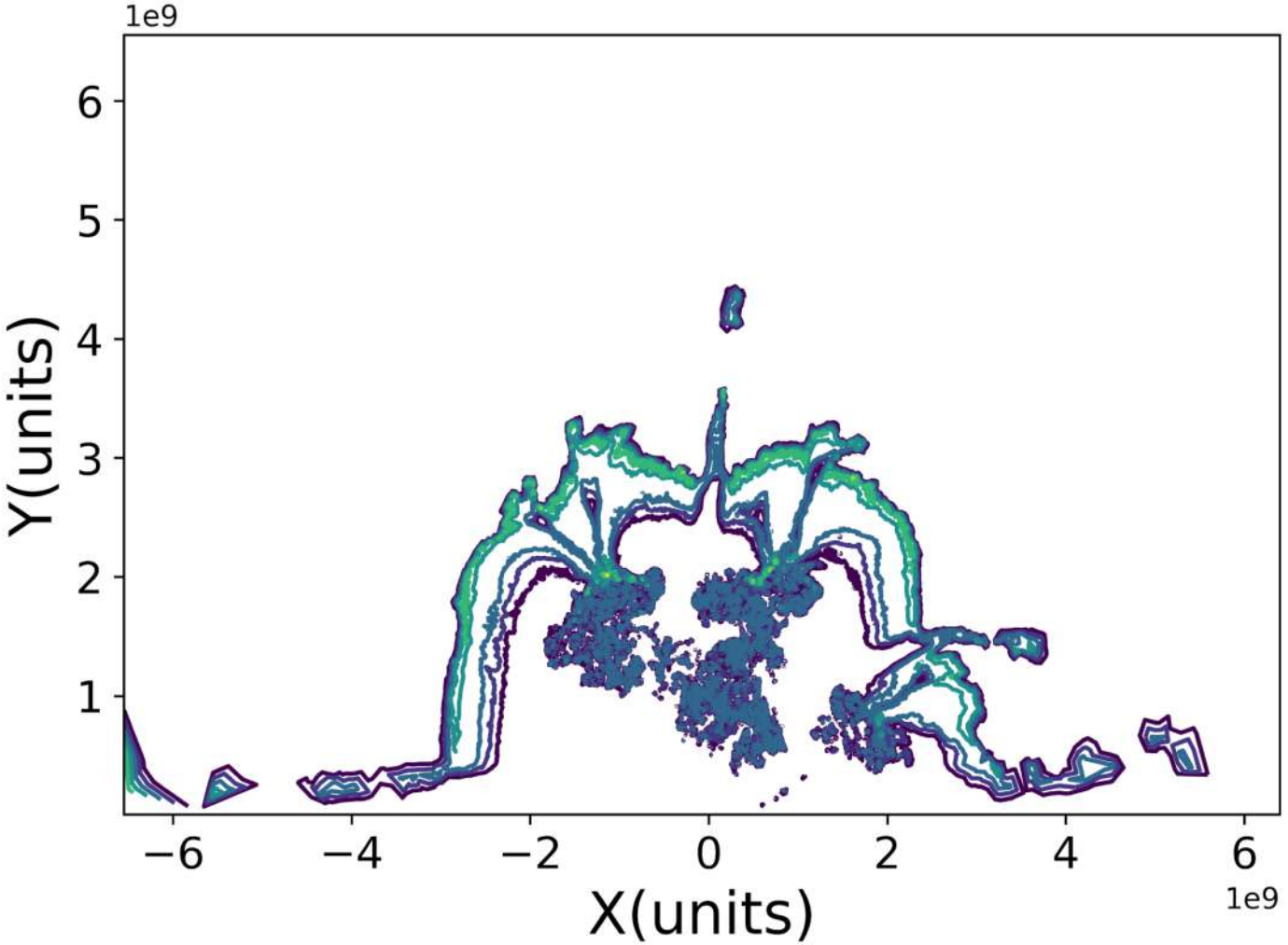
Mr James Keegans

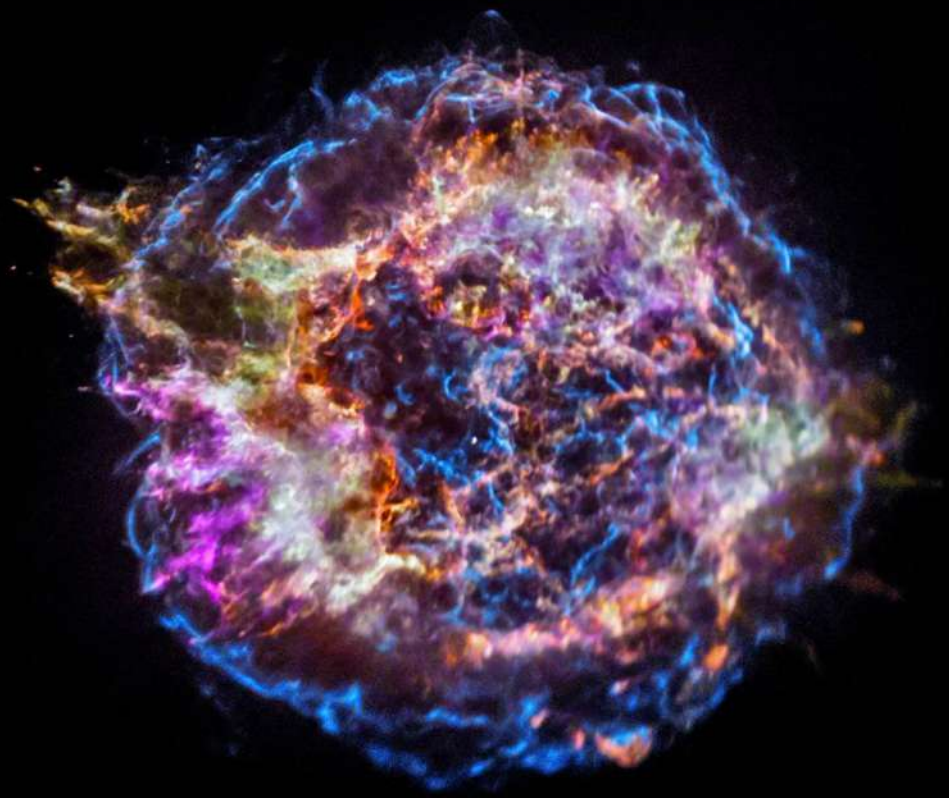
UNIVERSITY
OF HULL

Here you can see where it is produced in X/Y coordinates

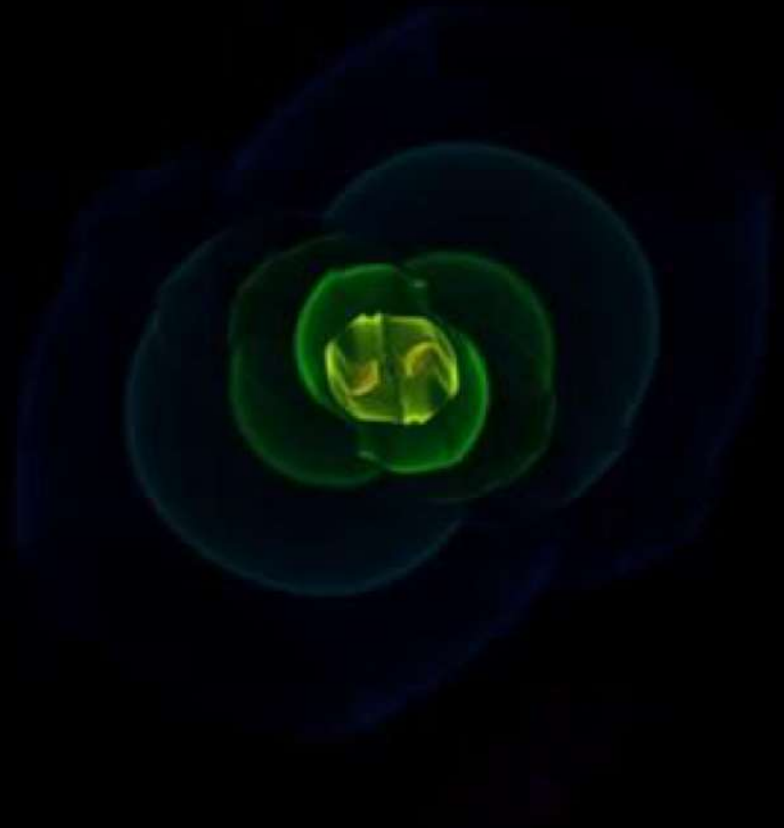
It's not symmetric - just like the real SN explosion!

(but there are differences…)





Cassiopeia A - A dying star throwing its material into the wider universe. Image credit: NASA/CXC/SAO



UNIVERSITY OF HULL

Day 1 and 3 Notebooks- Progress and Questions

You should, after working through these, be able to use

1. Lists and arrays
2. Loops
3. Mathematical operations
4. Read and write to files
5. Plot graphs
6. Define functions…

Many useful tools - and the start of learning Python!

UNIVERSITY OF HULL

What we're going to do:

09:00 - 09:20	- Introduction to Python
09:20 - 10:00	- Revision of homework and advanced notebook
10:00 - 10:30	- Break
10:30 - 12:00	- Kepler's Laws of Planetary Motion
12:00 - 13:30	- Lunch
13:30 - 15:00	- HR Diagrams and Stellar Evolution
15:00 - 15:30	- Break
15:30 - 17:00	- Kepler's Laws and Numerical Derivatives

UNIVERSITY OF HULL

Any Questions?

Please raise your hand

OR

Add a question on paper to the box at the front

OR

Post your question to menti.com with the code 15 03 71

UNIVERSITY OF HULL

First things first: Installing Anaconda

- We will be using Python 2.7 for ThaiPASS'19
- We will use Anaconda as the platform for running Python
- https://www.anaconda.com/distribution/

UNIVERSITY OF HULL

Homework revision and Advanced Notebook

The UK team will walk around and help you with any problems you had with the homework.

Once you are satisfied with your understanding of the homework, you can begin the advanced notebook.

After the break we will start the first ThaiPASS’19 task!