Computational Galaxy Evolution and Cosmology

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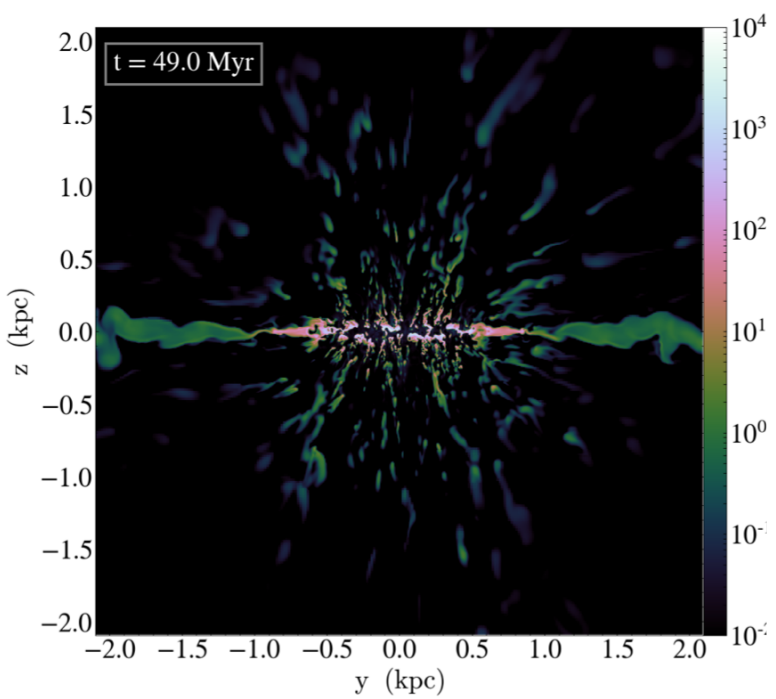
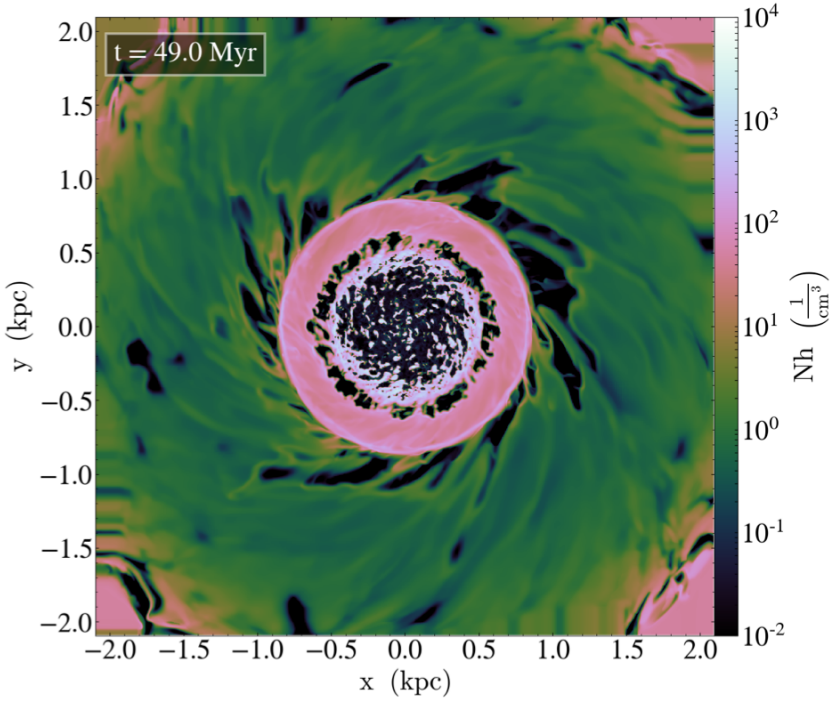
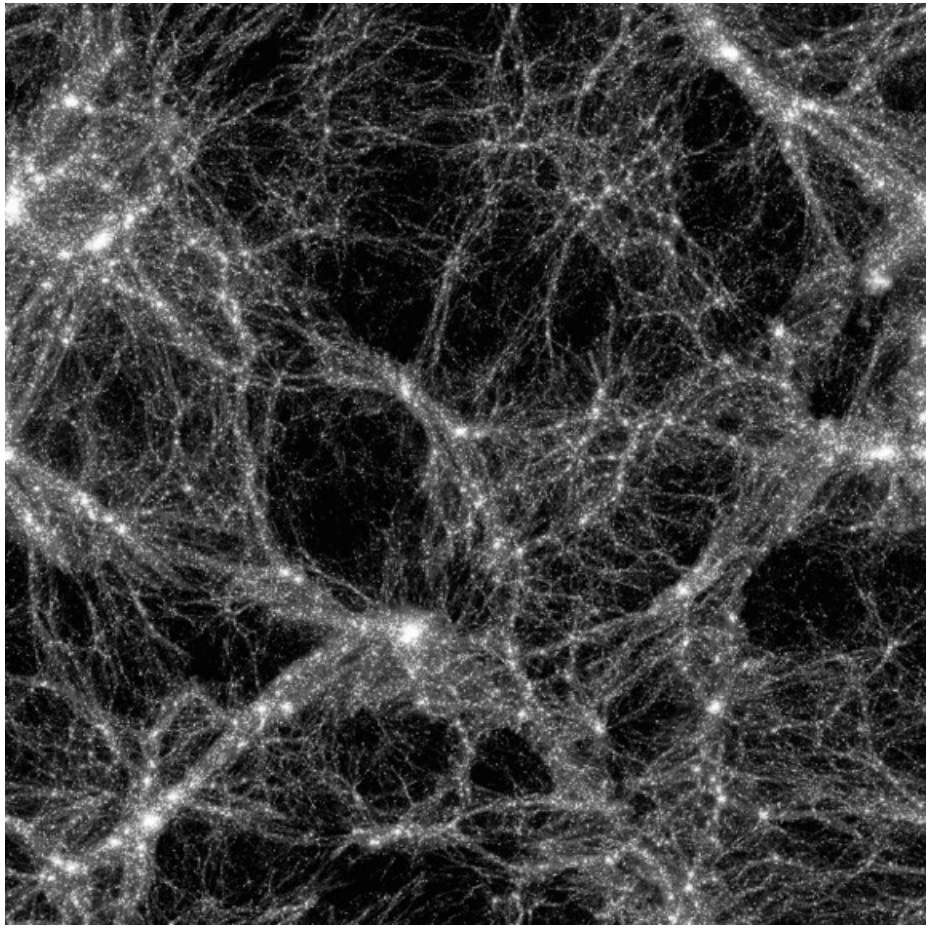
M82: a real galaxy with blowing out gas.
These outflows are called Galactic Winds.





Question: what drives Galactic Winds?
Eulerian hydro-dynamical simulations of a disc galaxy blowing out gas. Supernovae can drive outflows.

Large Scale Structure of the Universe



Cosmic Web: matter distribution on the scale of 10^8 light years.

Questions:

1. How can we detect if a point in the Universe is in a knot, filament, sheet or void?

2. What are the properties of matter and galaxies in each region of the Cosmic Web?

3. What does that tell us about the evolution of the Universe after the Big Bang?

Answers require large simulations, simulation data exploration, feature detection, feature classification, time series analysis, etc..