



SHADOWFAX: a public moving-mesh code

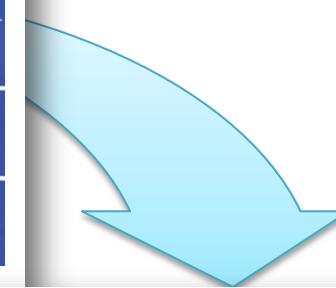
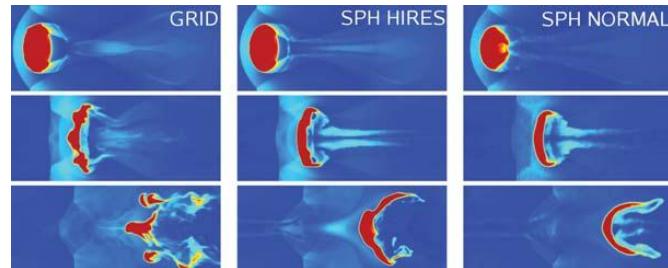
Bert Vandenbroucke

@drvandenbroucke, bert.vandenbroucke@ugent.be

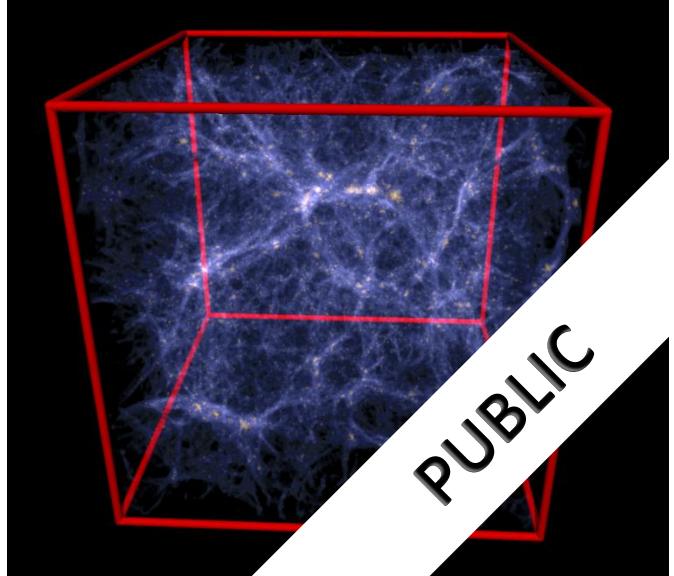
Ghent University

Background

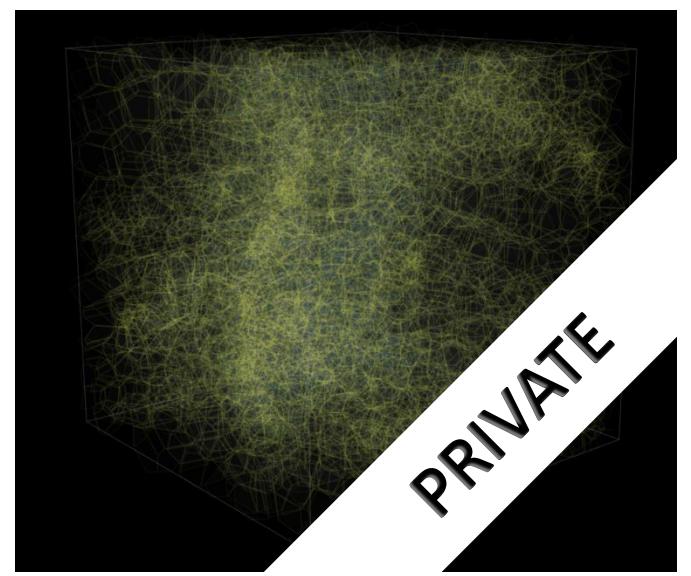
Agertz et al. (2007)



GADGET2, Springel (2005)

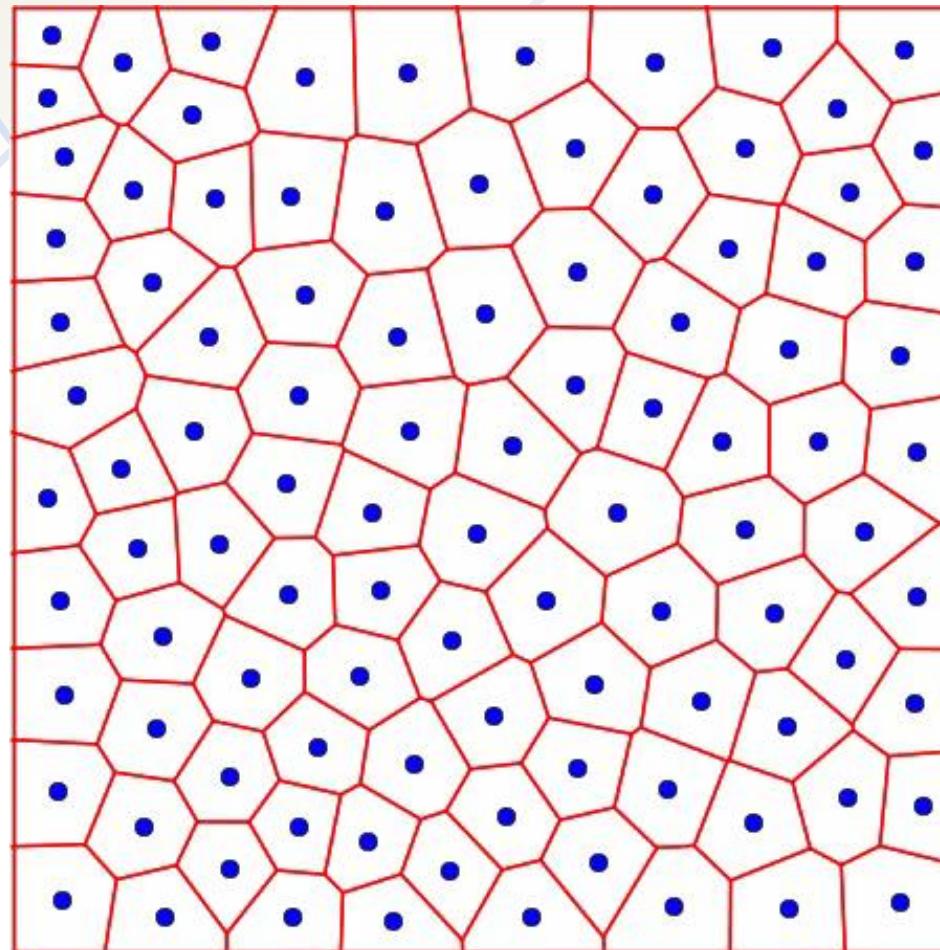


AREPO, Springel (2010)



Algorithm

Voronoi
mesh



Algorithm

$$\rho, \vec{v}, P$$

$$V$$

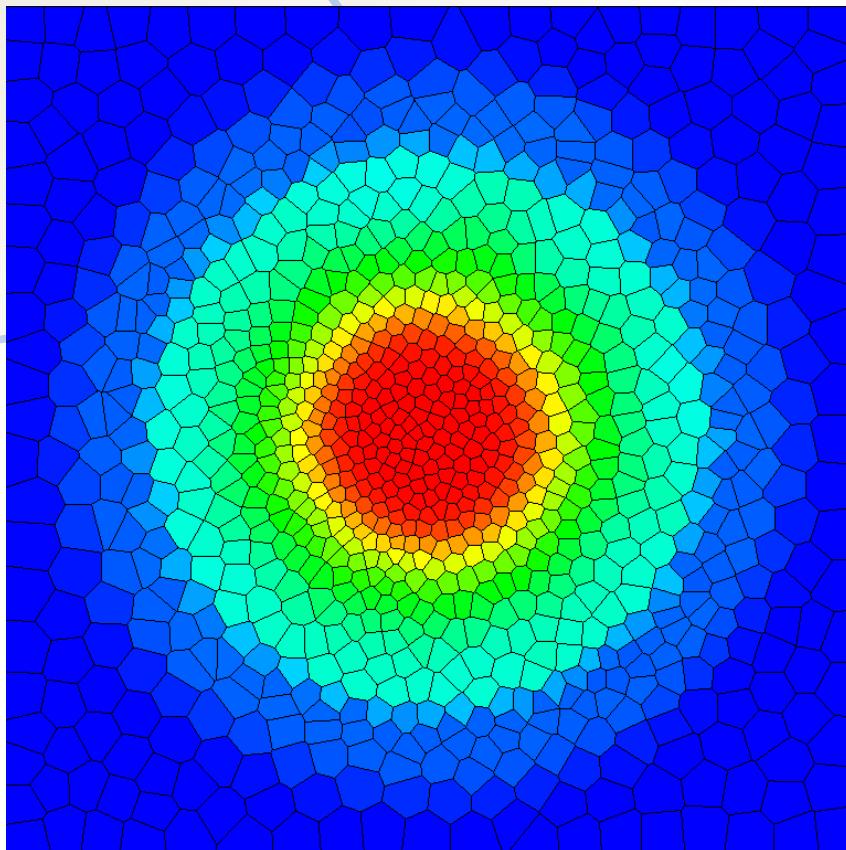
$$m, \vec{p}, E$$

Hydrodynamics
=
Flux exchange

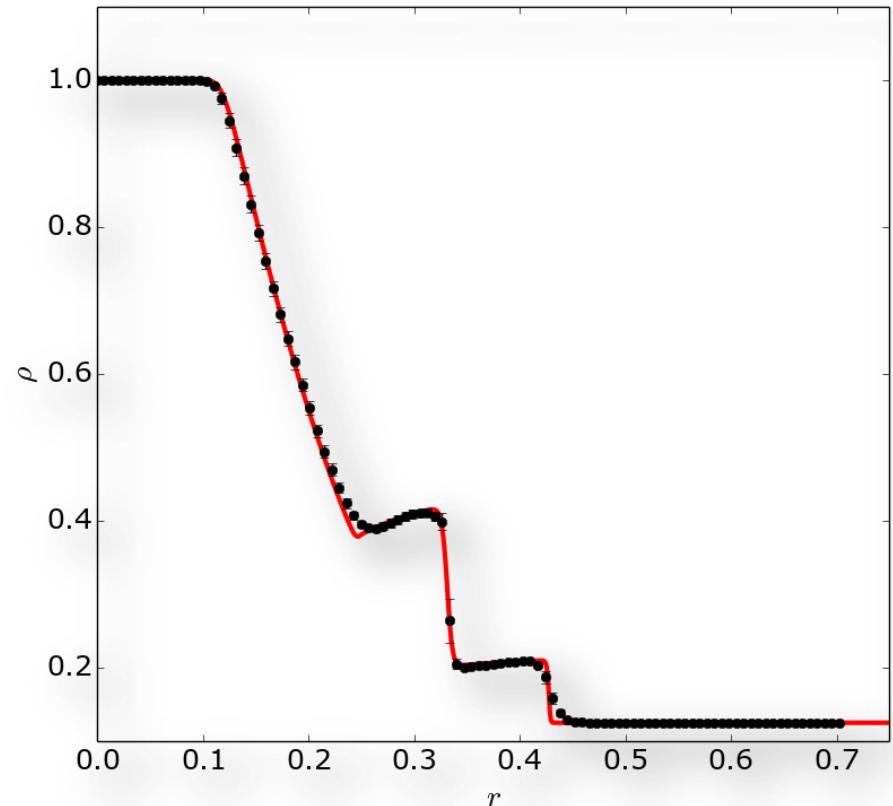
Flux estimated at
faces using solution
to *Riemann problem*

Algorithm

Spherical overdensity

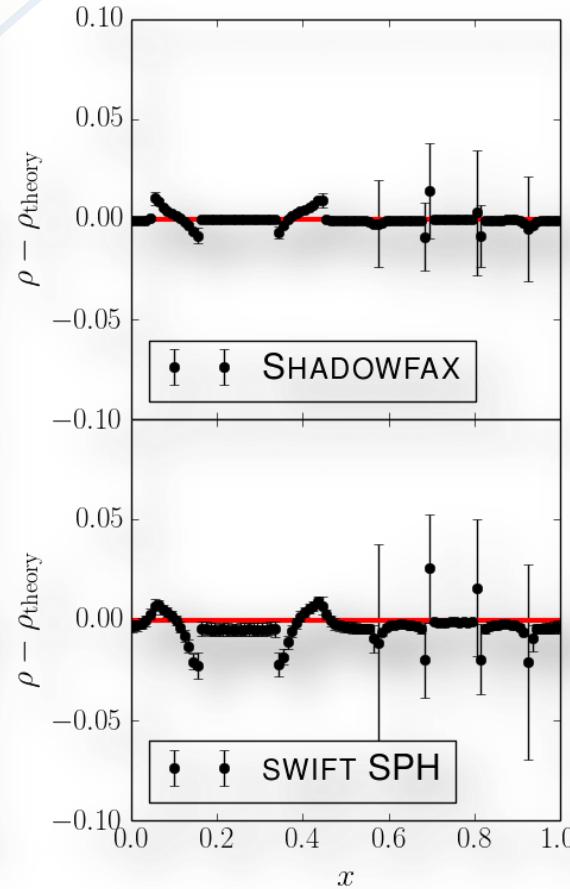
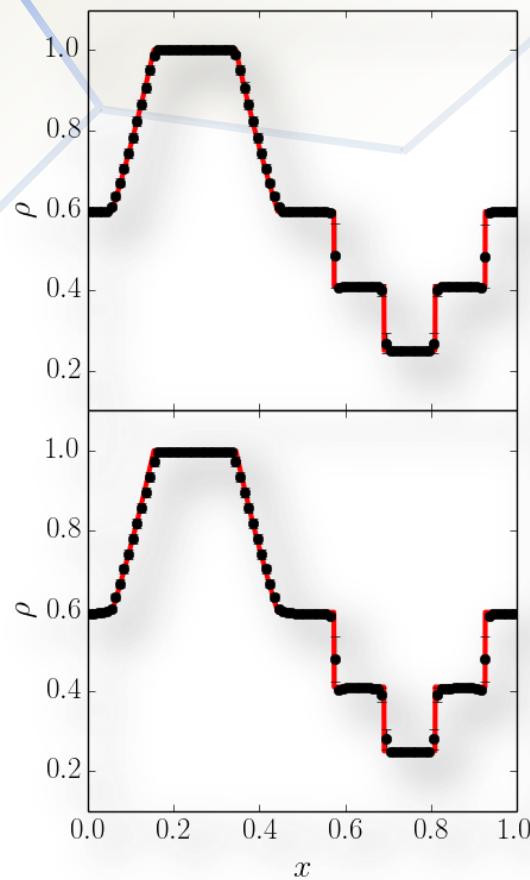


2D 10,000 cells



SHADOWFAX vs SPH

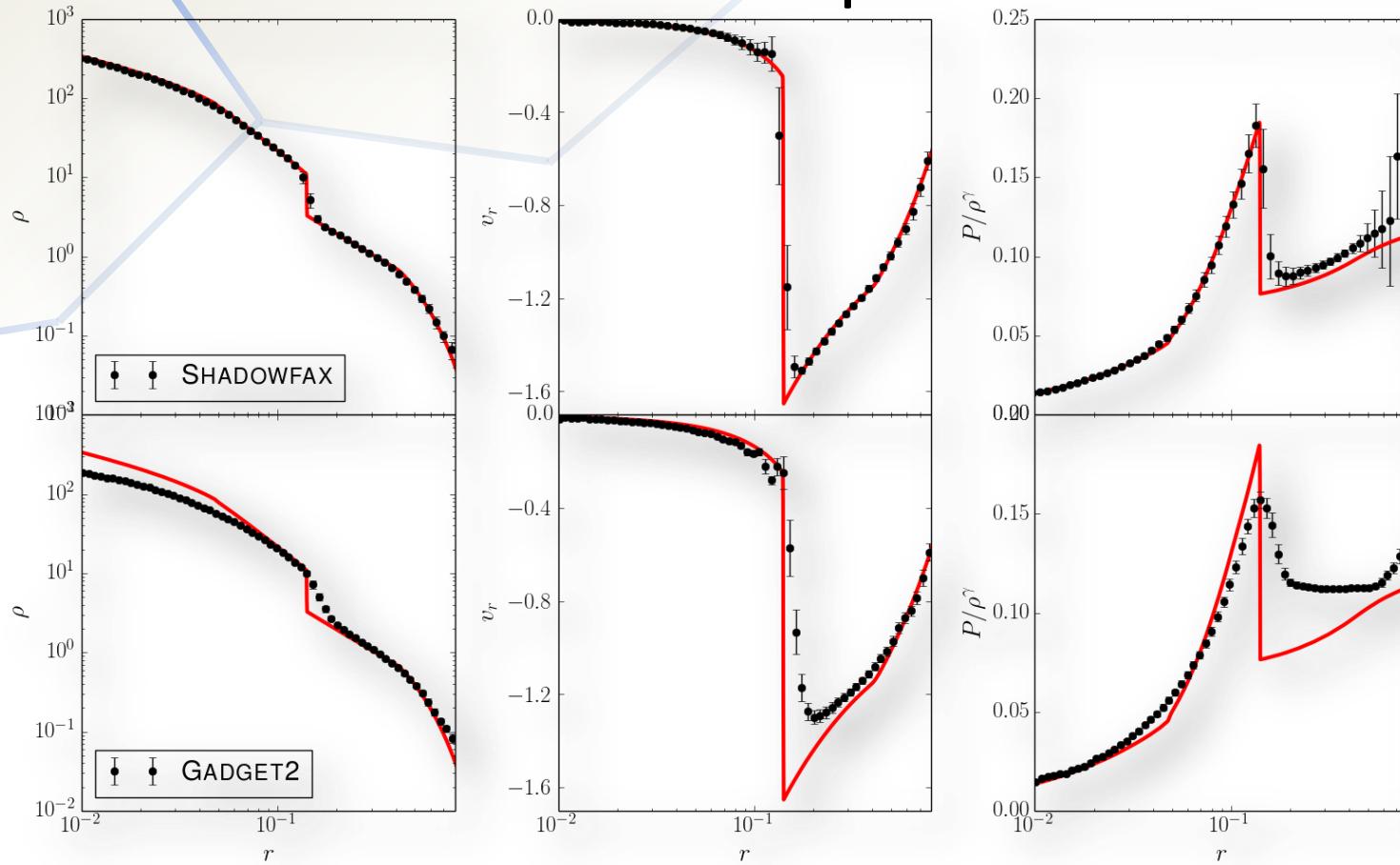
Sod shock



3D 1,024,128 cells/particles

SHADOWFAX vs SPH

Evrard collapse



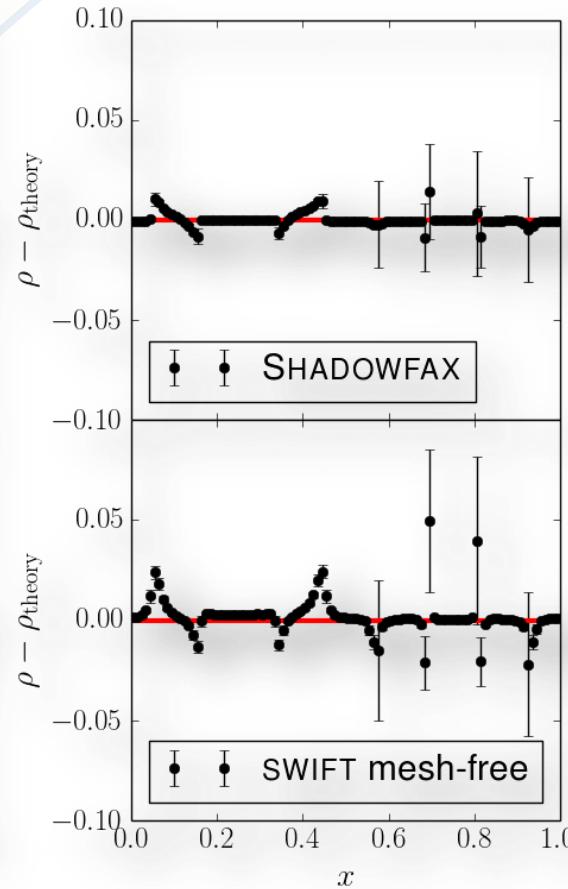
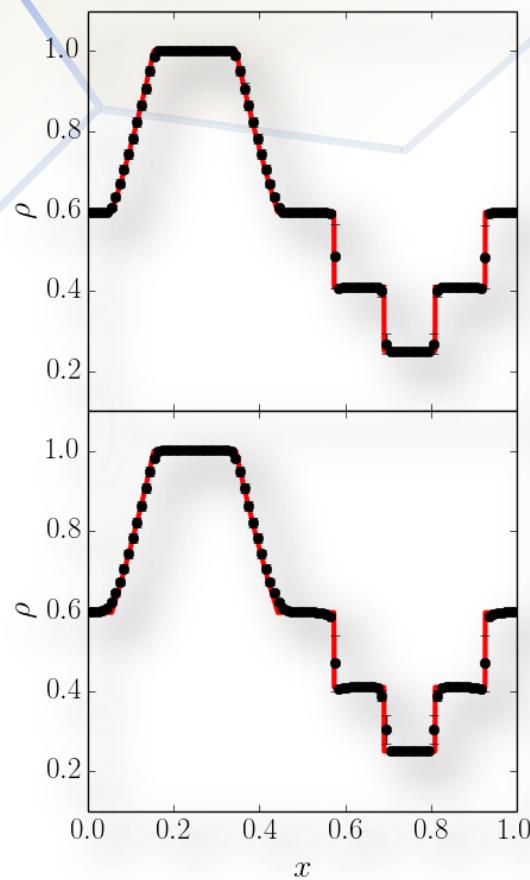
3D

16,599 cells/particles



SHADOWFAX vs GIZMO

Sod shock



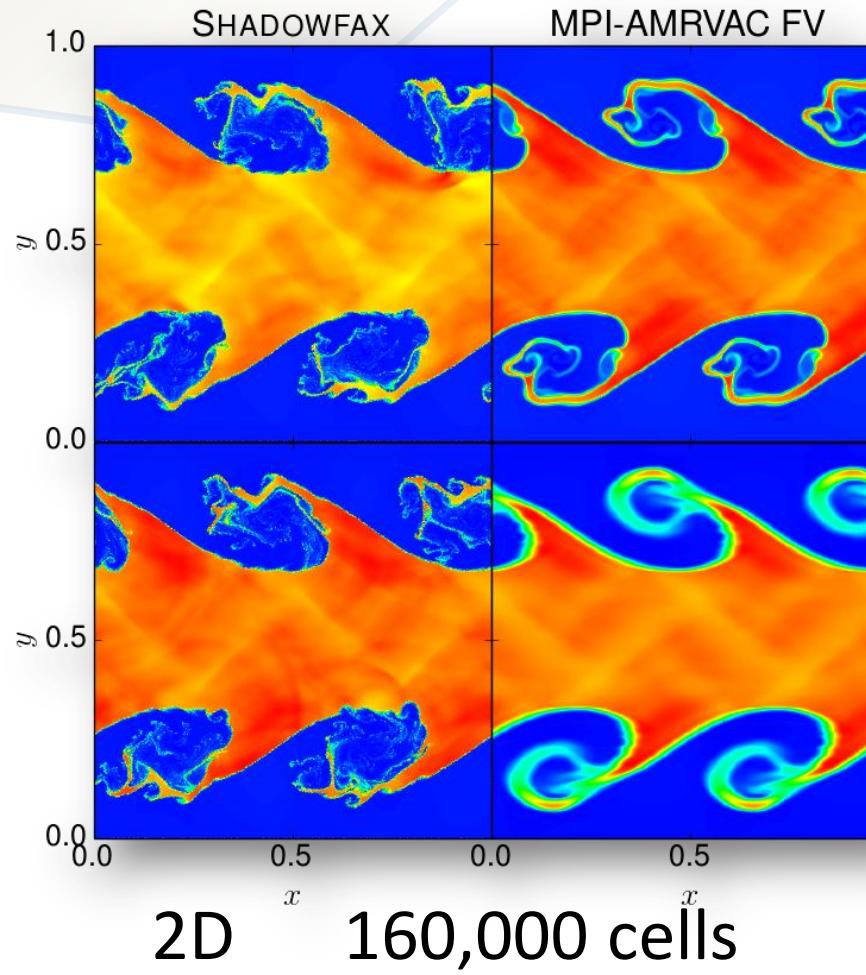
3D 1,024,128 cells/particles

SHADOWFAX vs AMR

Shearing layers

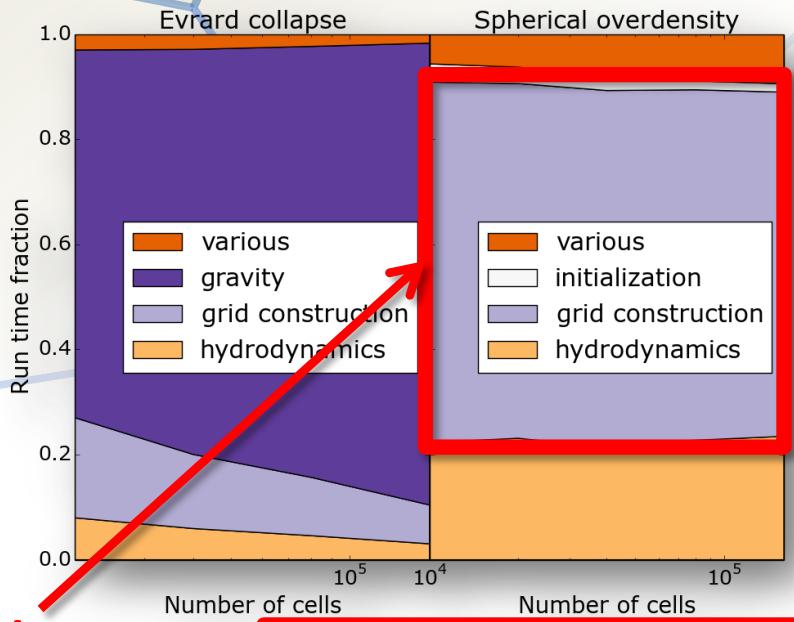
No bulk velocity

High bulk velocity



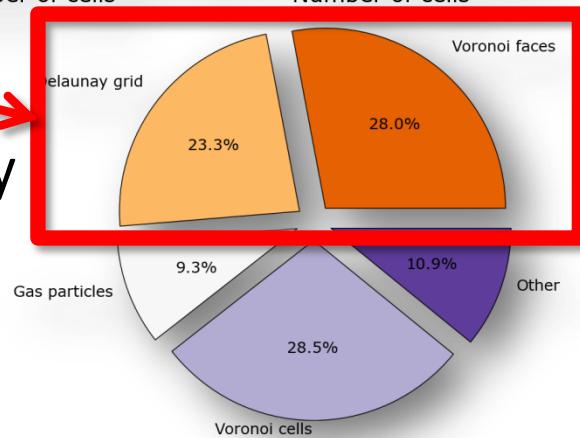
Scaling

Run time fractions

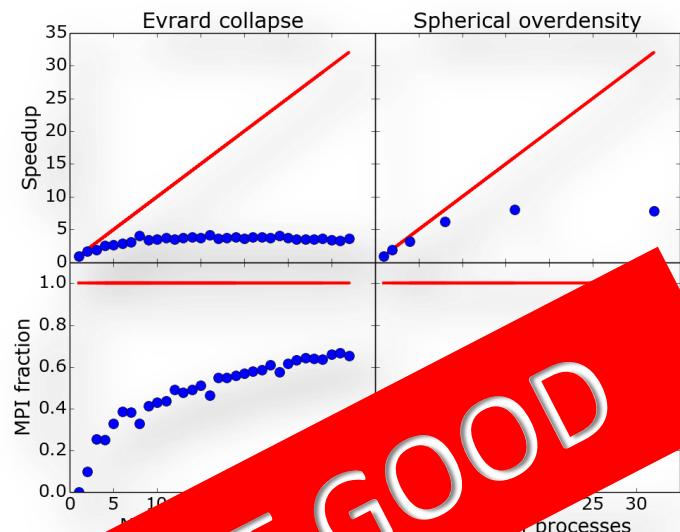


Grid

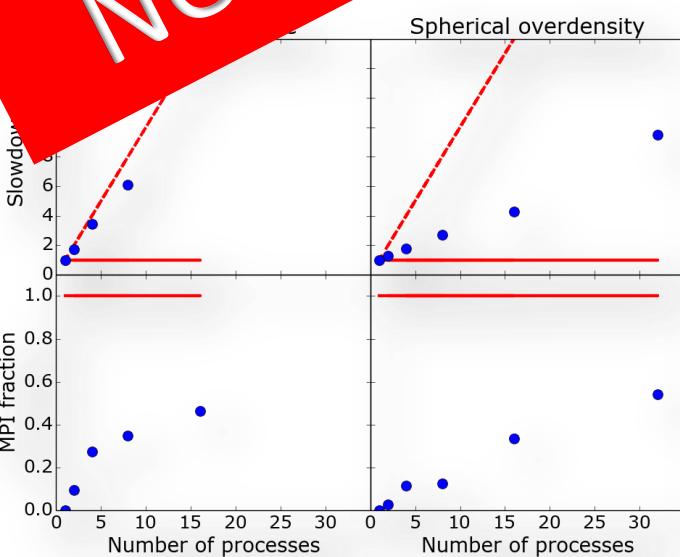
Memory usage



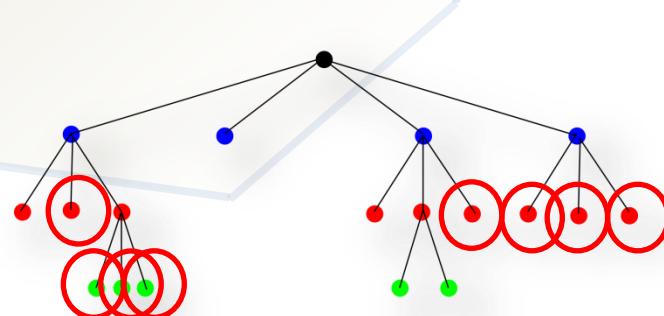
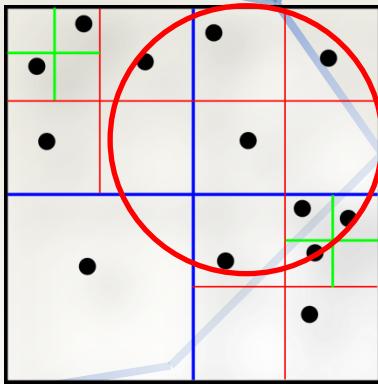
Strong scaling



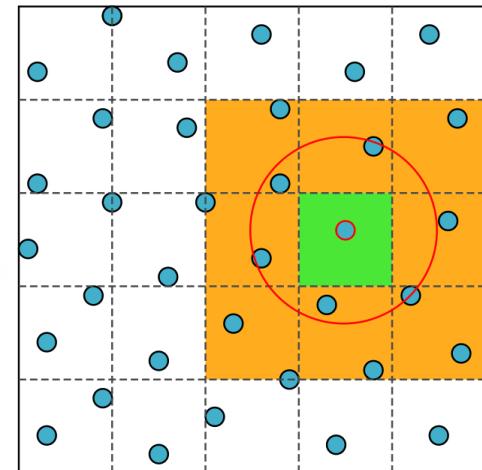
NOT GOOD



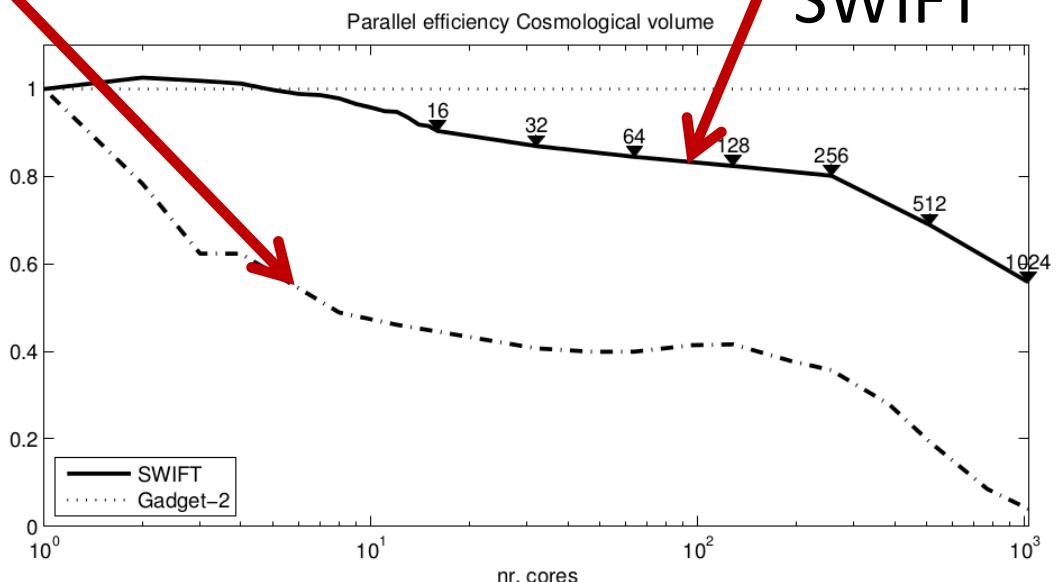
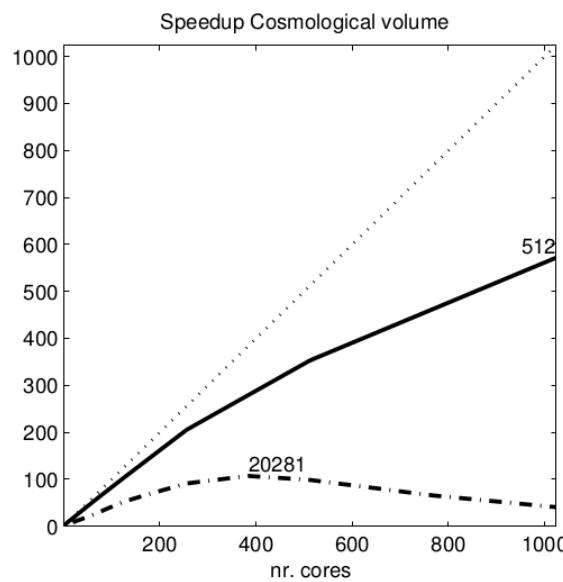
Outlook



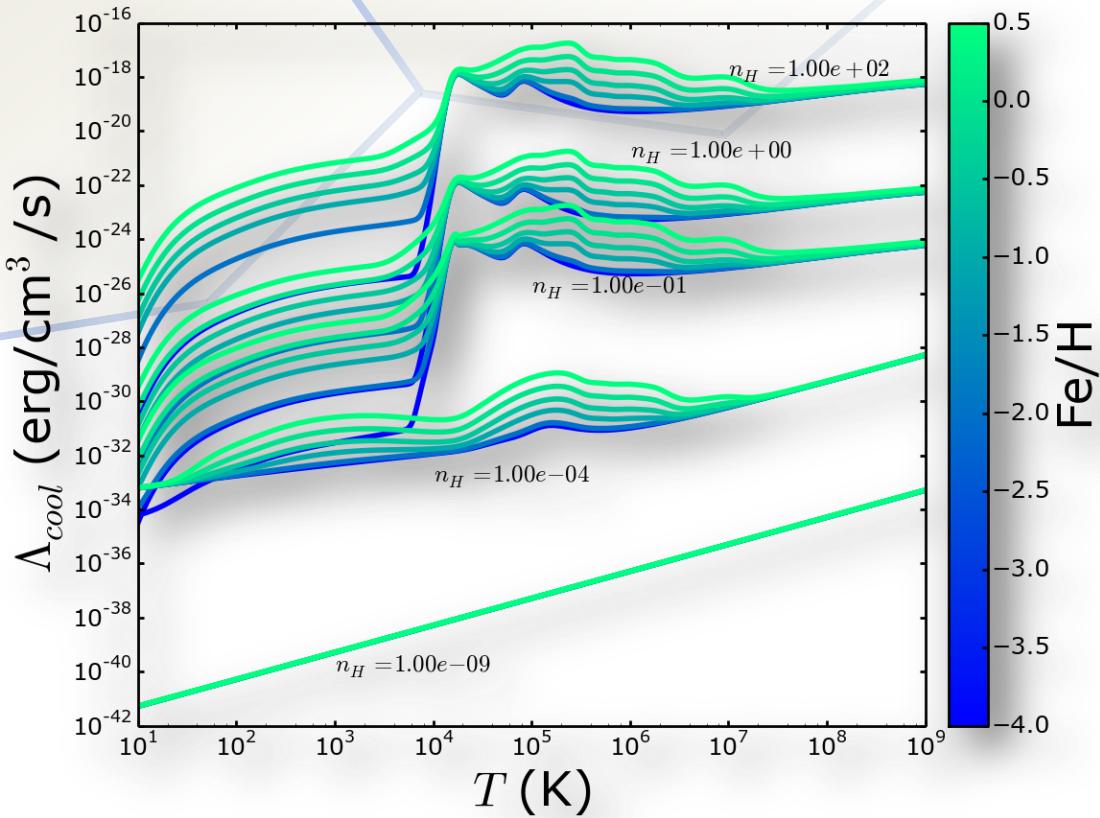
Tree-based



SWIFT



Outlook



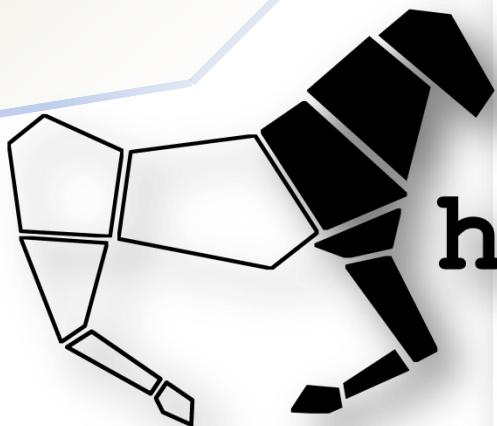
De Rijcke, S. et al. (2013)

- Sub-grid physics:
- Cooling/heating
 - Star formation
 - Stellar feedback
 - ...

ascl:1605.003

<https://github.com/AstroUGent/shadowfax>

<http://www.dwarfs.ugent.be/shadowfax>



Vandenbroucke &
De Rijcke (2016)

#shadowfax

The screenshot shows the GitHub repository page for "AstroUGent / shadowfax". The repository has 0 issues, 0 pull requests, 3 watchers, 6 stars, and 5 forks. The main page features a large "shadowfax" logo and a 3D visualization of a simulation titled "3D Evrard collapse test". The code structure on the left includes files like CMakeLists.txt, COPYING, Doxyfile.in, README.md, format_script.sh, shadowfax_logo.p, write_version.cma, and README.md.

This repository contains 15 contributions by bwvdnbro. The main page also includes links to HOME, ABOUT, GALLERY, TEST PROBLEMS, PUBLICATIONS, and a "GET SHADOWFAX" button.

Shadowfax
A moving mesh code

Slide 14 out of 13

