

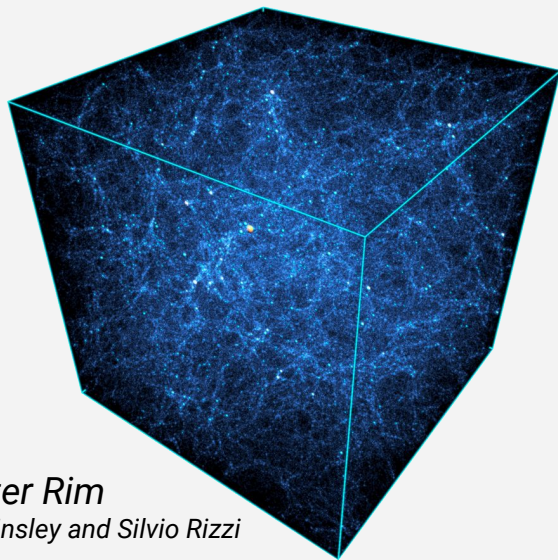
Simulation Calibration of Cluster WL Mass Measurements

Joe Hollowed

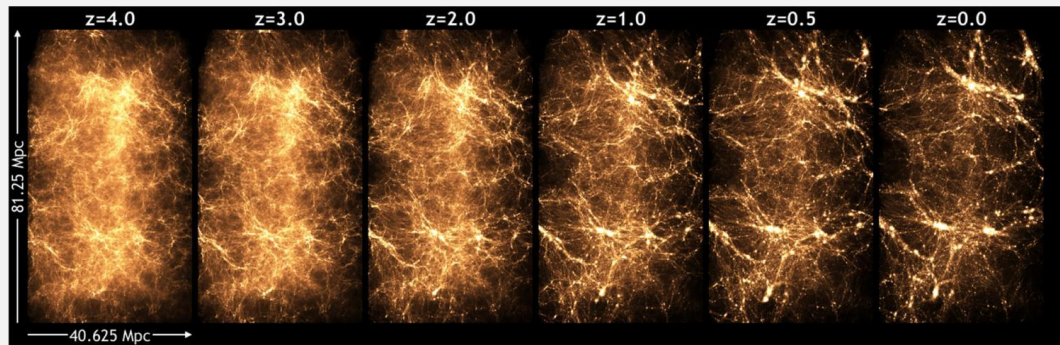
South Pole Telescope Cluster F2F
6/25/18

Simulation Calibration of Cluster WL Mass Measurements

Base Simulations - HACC



Outer Rim
Joe Insley and Silvio Rizzi

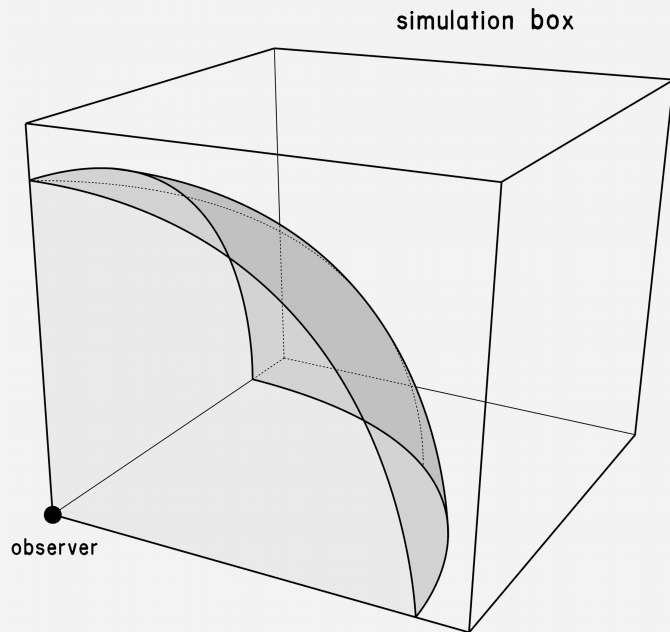


Q-Continuum
Heitmann et al. 2014



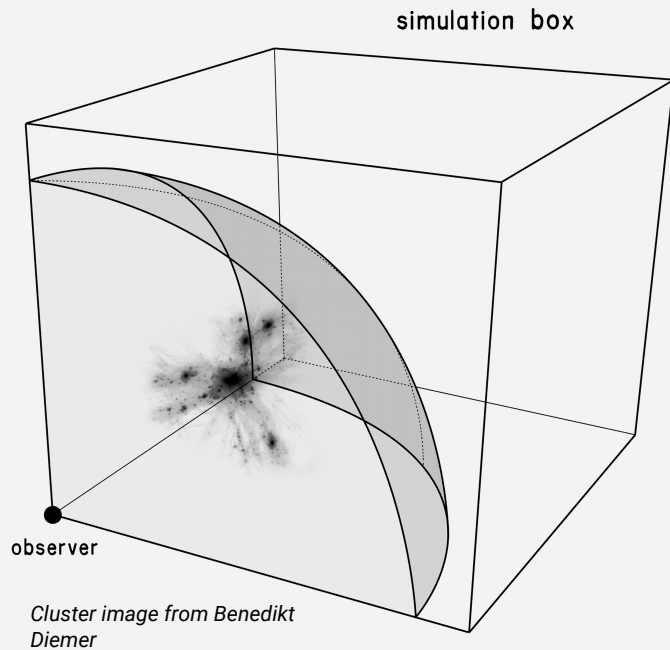
Simulation Calibration of Cluster WL Mass Measurements

Lightcone Construction to Ray Tracing



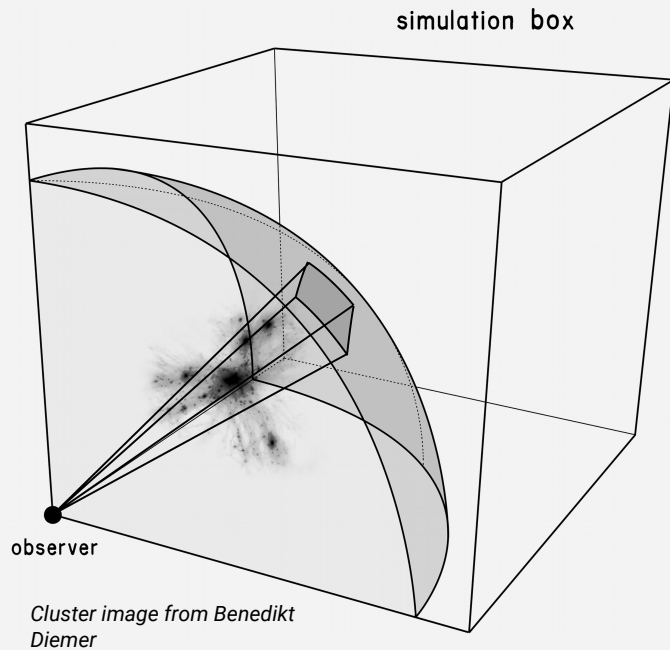
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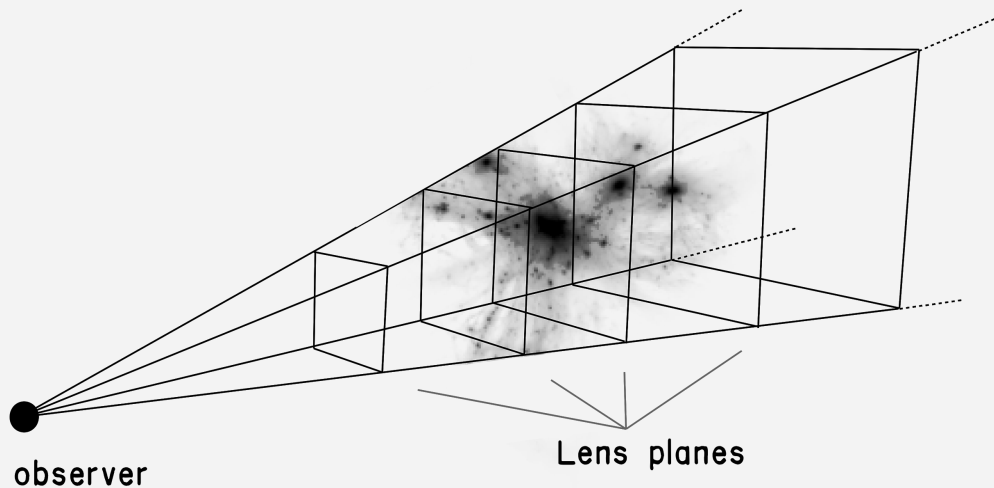
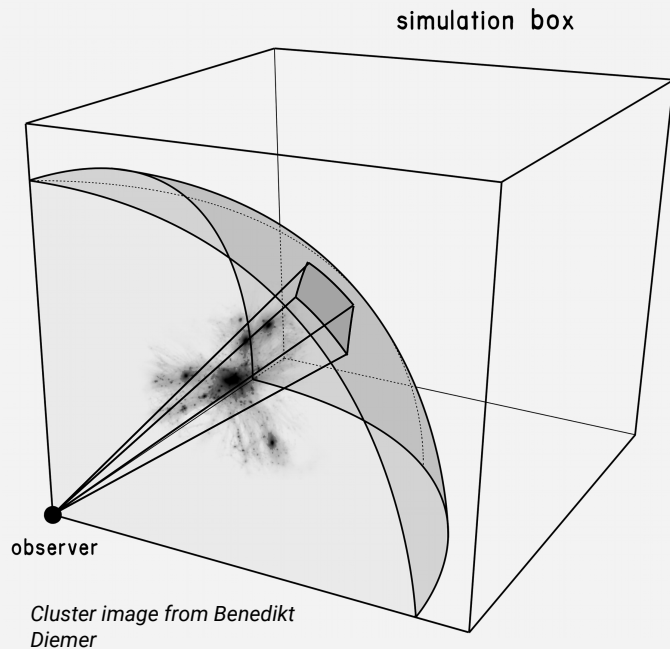
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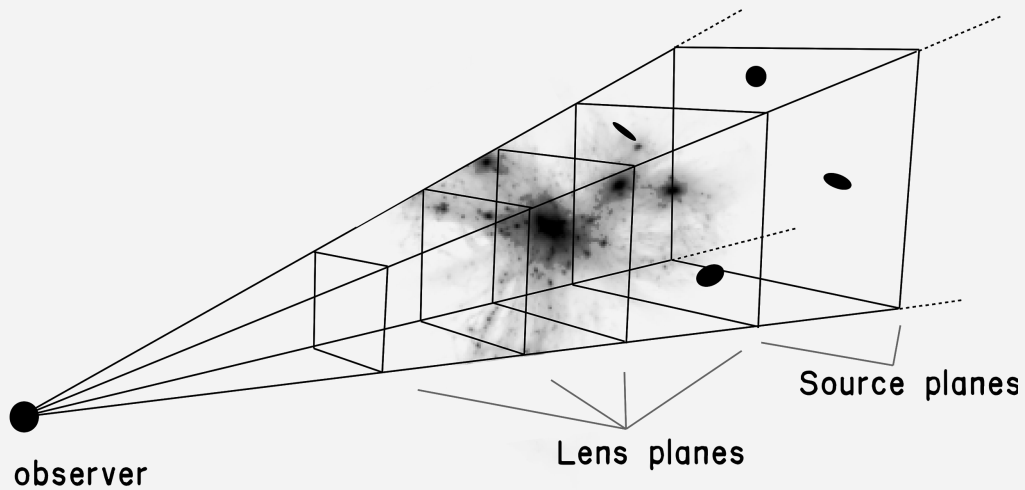
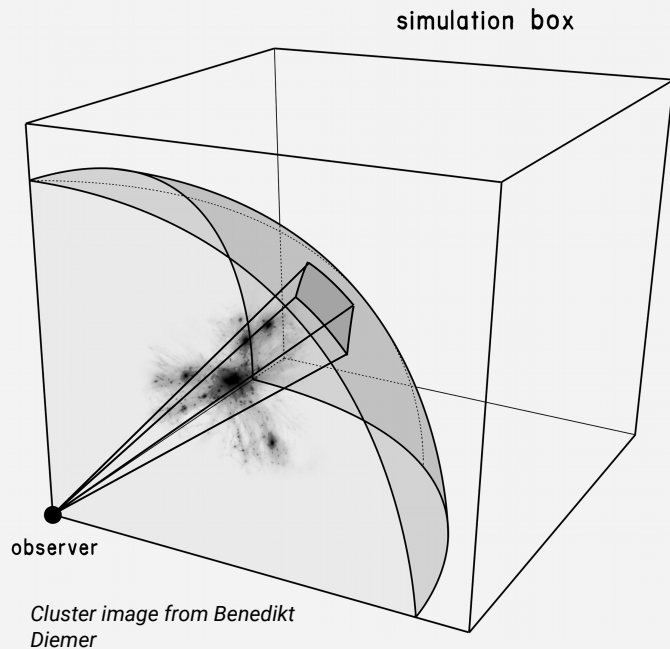
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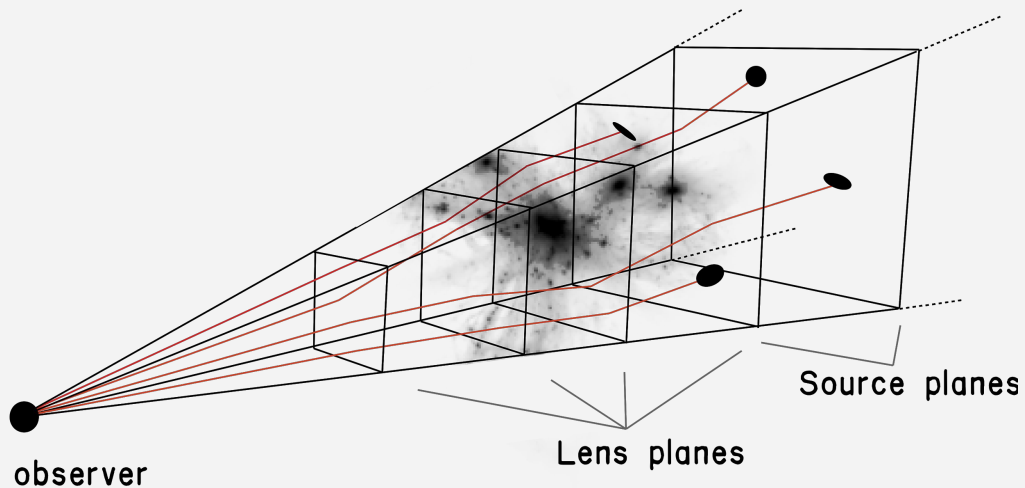
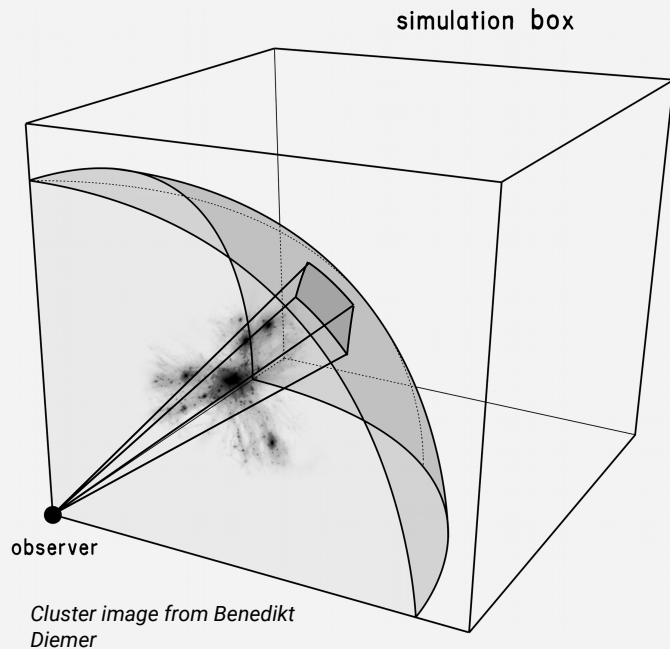
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Simulation Calibration of Cluster WL Mass Measurements

Example Halo Properties:

$z = 0.503$

mass = $2.703 \times 10^{14} M_{\odot} h^{-1}$

Ray Tracing:

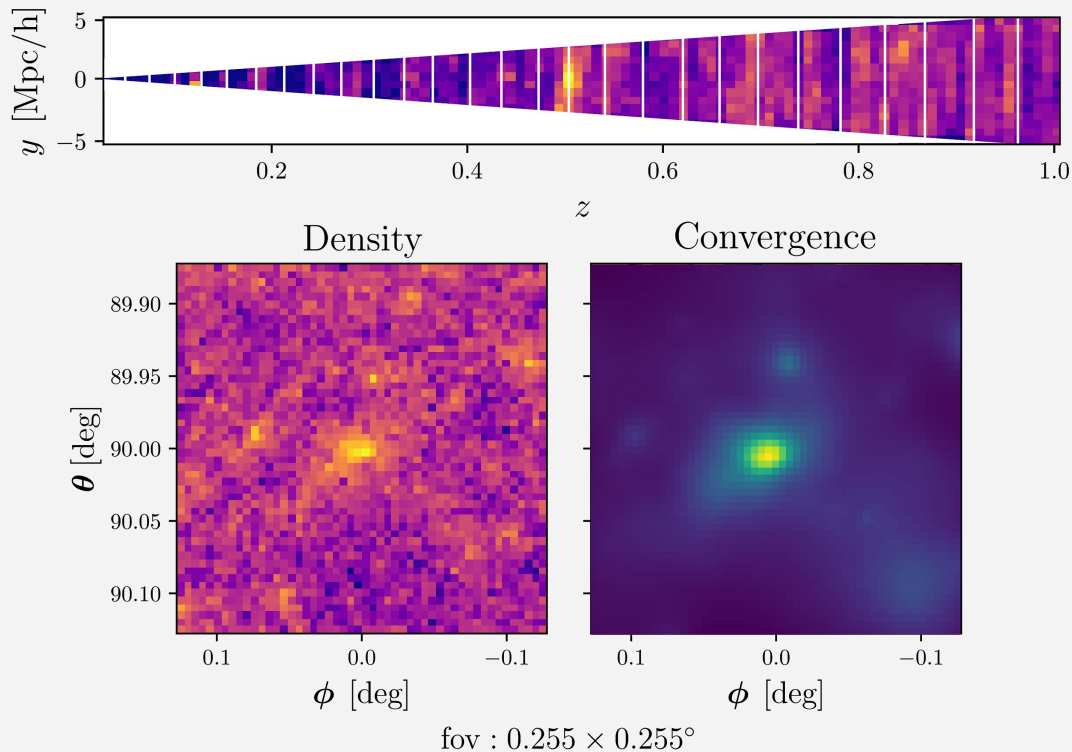
Source plane at $z = 1$

28 lens planes from $0 \leq z \leq 1$

SPH particle smoothing

To do:

- Perhaps revise density estimation approach
- Replace single source plane with many planes, weighted by $N(z)$ (DES, LSST,...)



Simulation Calibration of Cluster WL Mass Measurements

Base simulations:

AlphaQuadrant:

$256 (h^{-1}\text{Mpc})^3$
 1024^3 particles
 $1.1 \times 10^9 h^{-1} M_{\odot} \text{ mpp}$
WMAP-7

OuterRim:

$3000 (h^{-1}\text{Mpc})^3$
 10240^3 particles
 $1.8 \times 10^9 h^{-1} M_{\odot} \text{ mpp}$
WMAP-7

Lightcone products:

AlphaQuadrant:

1% particles to $z=1$
Full particles to $z=1$
Halos to $z=1$ ($\sim 30k > 10^{14}$)

OuterRim:

Particles to $z=3$ (sampling TBD)
Halos to $z=2$

Smaller simulation data more computationally affordable; will allow for convergence studies on ray-tracing strategy:

- LOS structure sampling
- Pixelization for surface density/lensing maps
- Cutout sizes
- Redshift resolution



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Use conclusions for larger-scale runs (larger lightcone volume and more unique halos)

