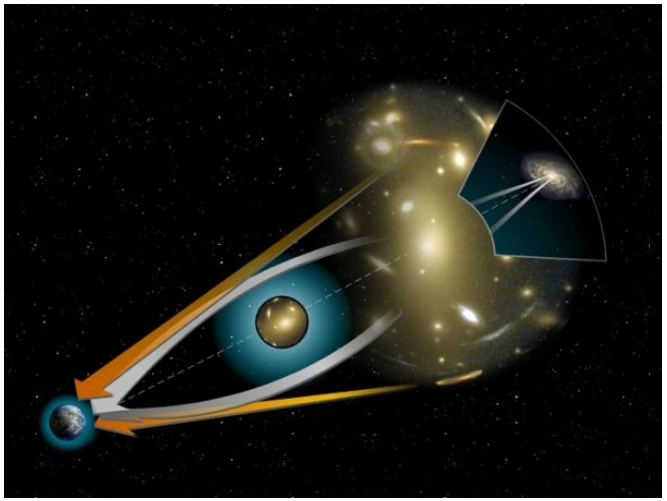
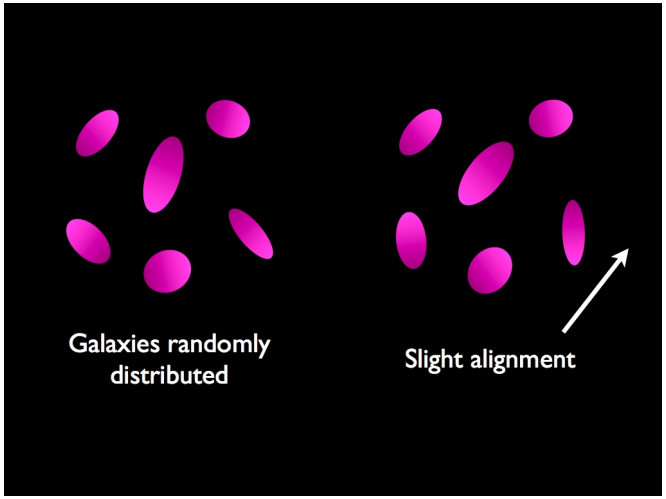
X-ray and weak lensing measurements of galaxy groups and clusters

- Mass ~ 1E13 – 1E15 Msol
- Galaxies, a few %
- Diffuse hot gas, 10-20 %
  - T ~ 10-100 x 10^6 K
  - n ~ 10^{-3}-10^{-5} cm^{-3}
- Dark matter halo, 80-90 %
- Figures: ESA/NASA/CXC





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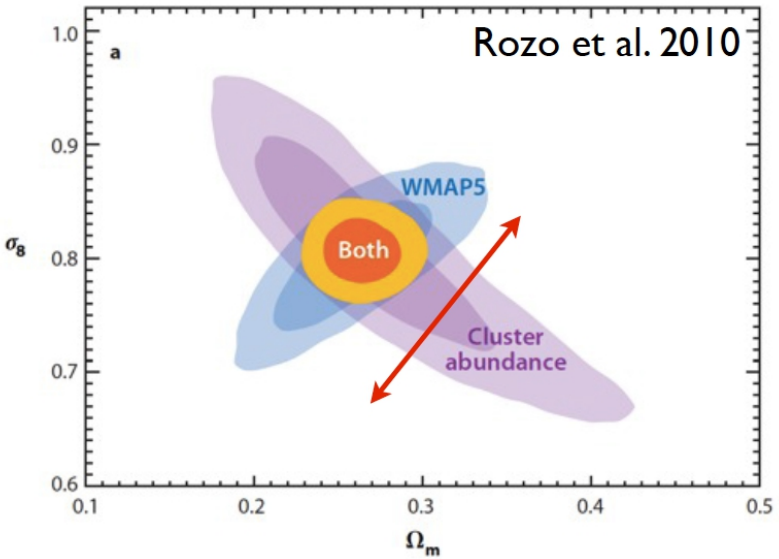
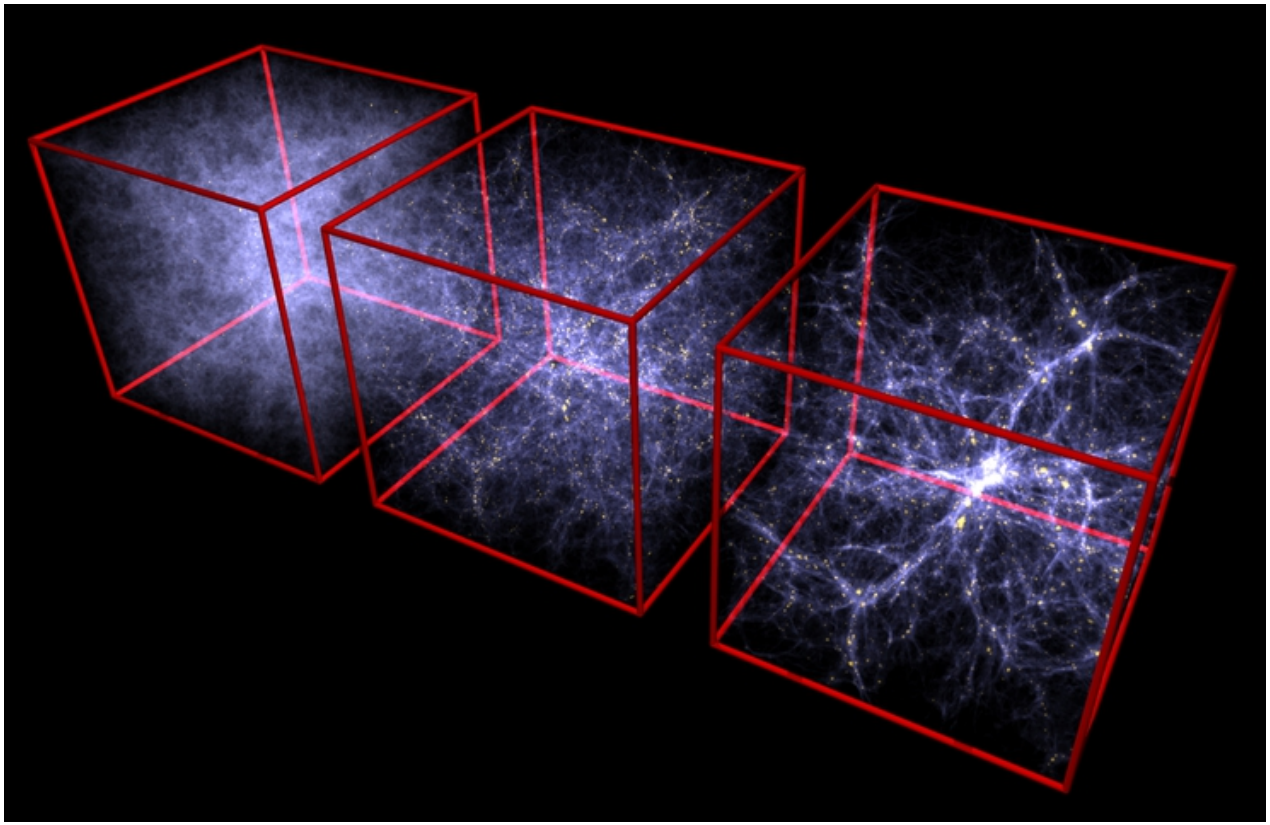
- Structure formation strongly dependent on cosmology
- Clusters are the most massive structures in the Universe → cluster counts give competitive and complementary cosmological constraints
- Need to know cluster masses for representative samples





z = 6, z = 2, z = 0
Figure: Volker Springel

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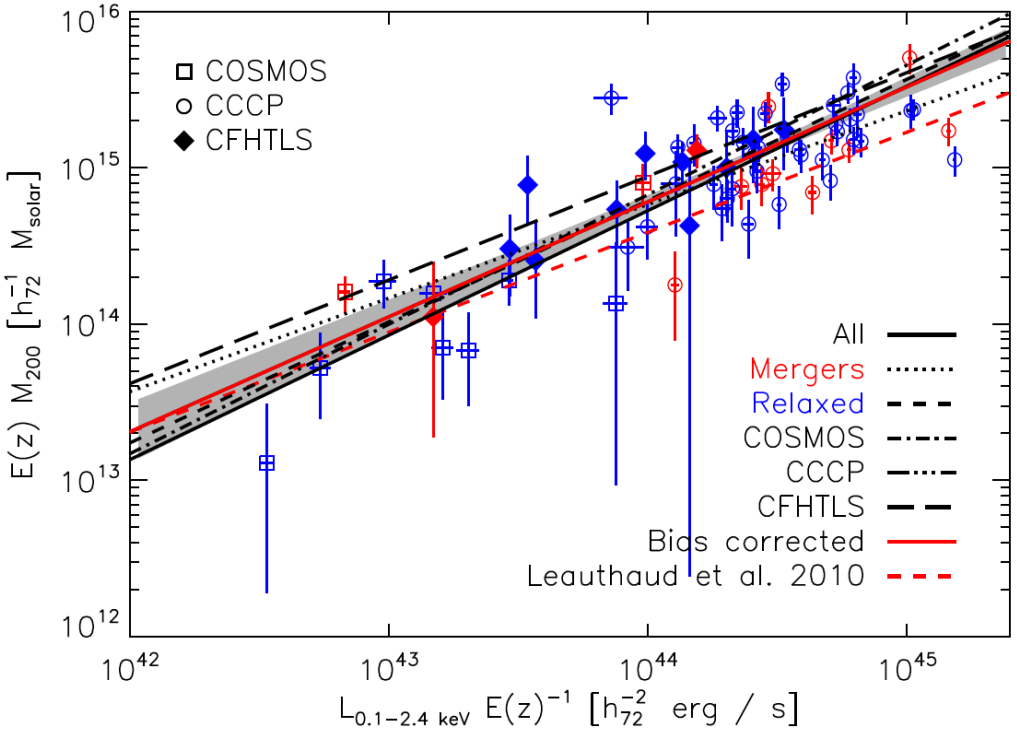

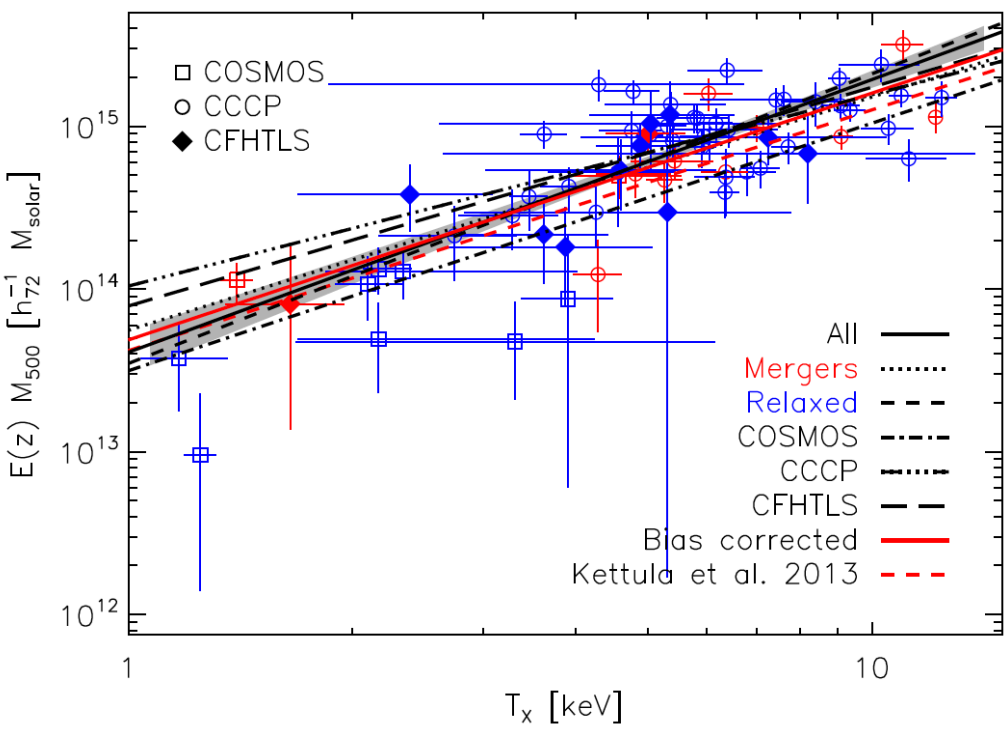

- Scaling relation between mass and observable → calibrate mass proxy
- Weak lensing calibrated scaling relations in COSMOS and CFHTLS fields
  - Extend to low-mass systems
  - Understand the impact of selection effects
  - Provides the current limitations for Lx and Tx as mass proxies