eROSITA
Importance of galaxy cluster shapes for cosmology

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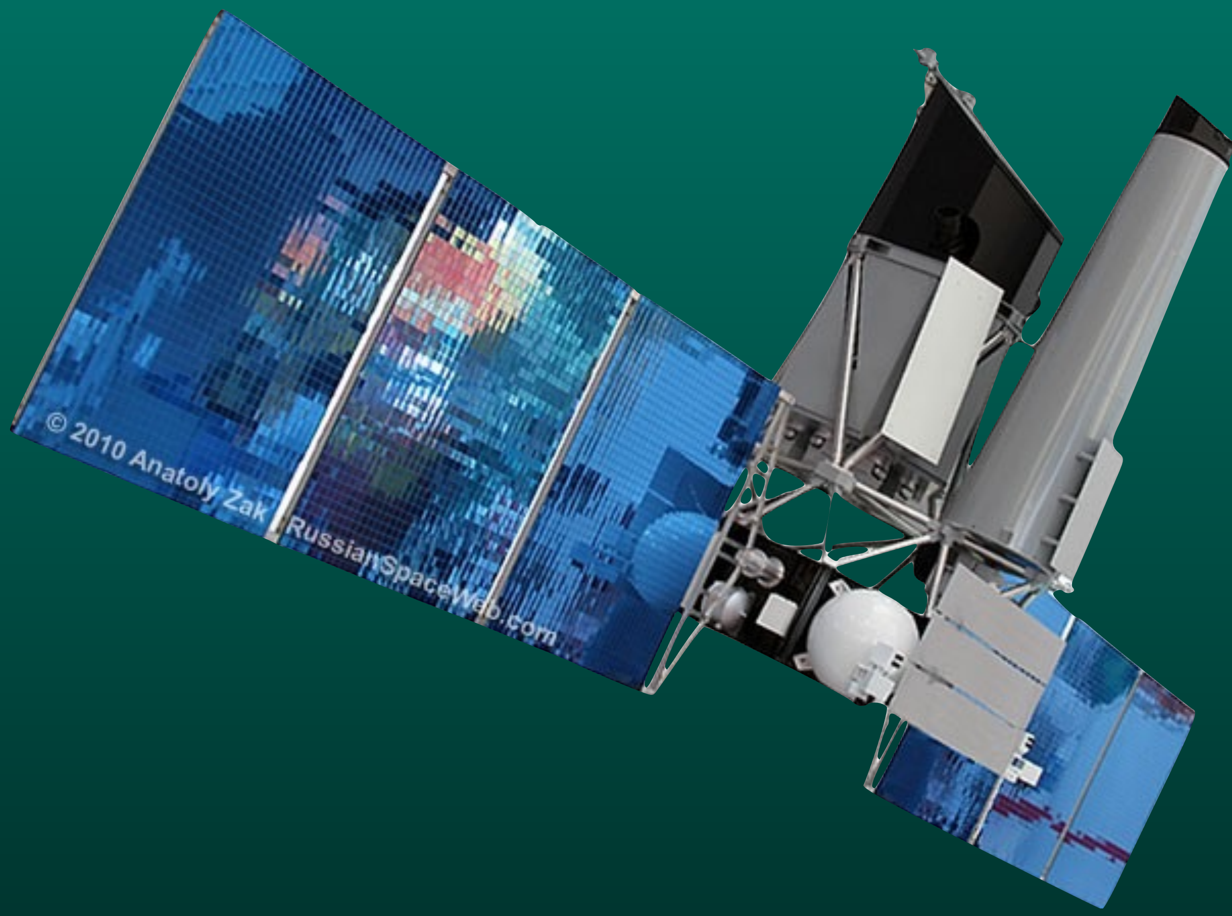
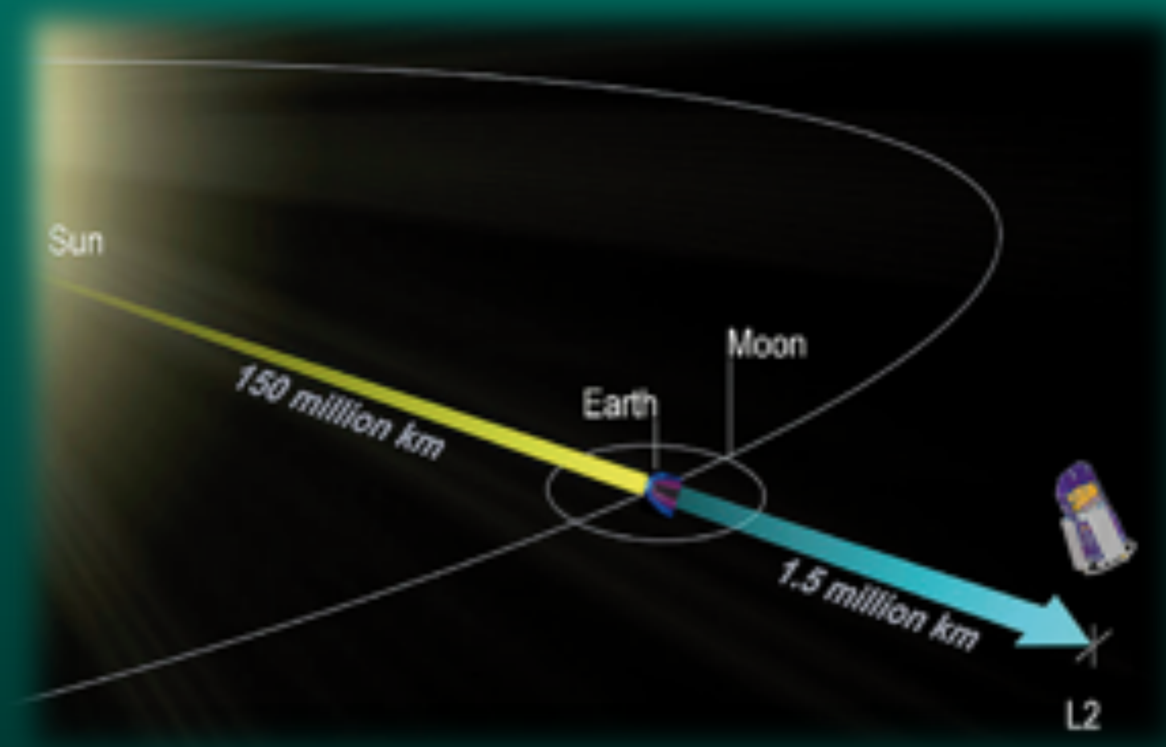
eROSITA- Mission profile

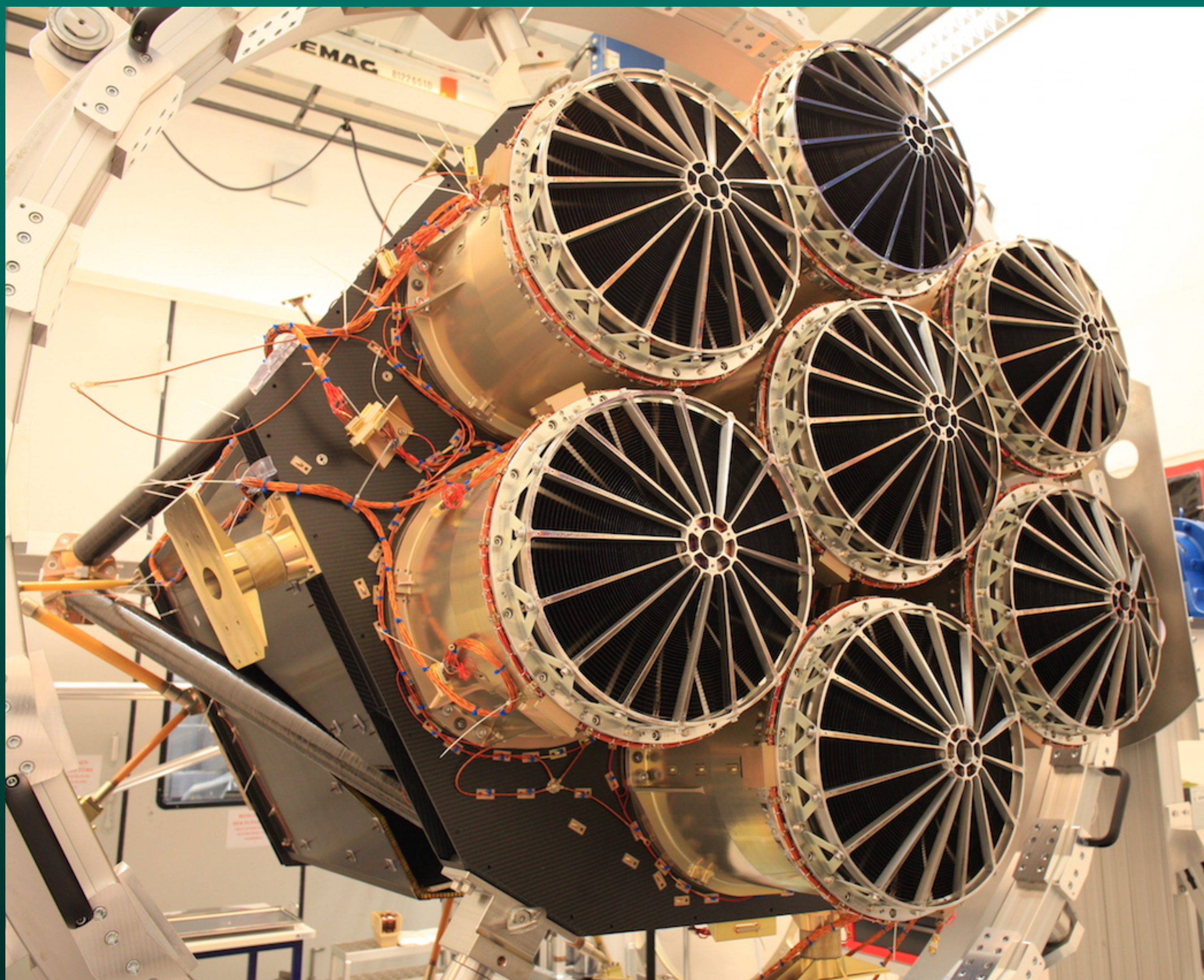


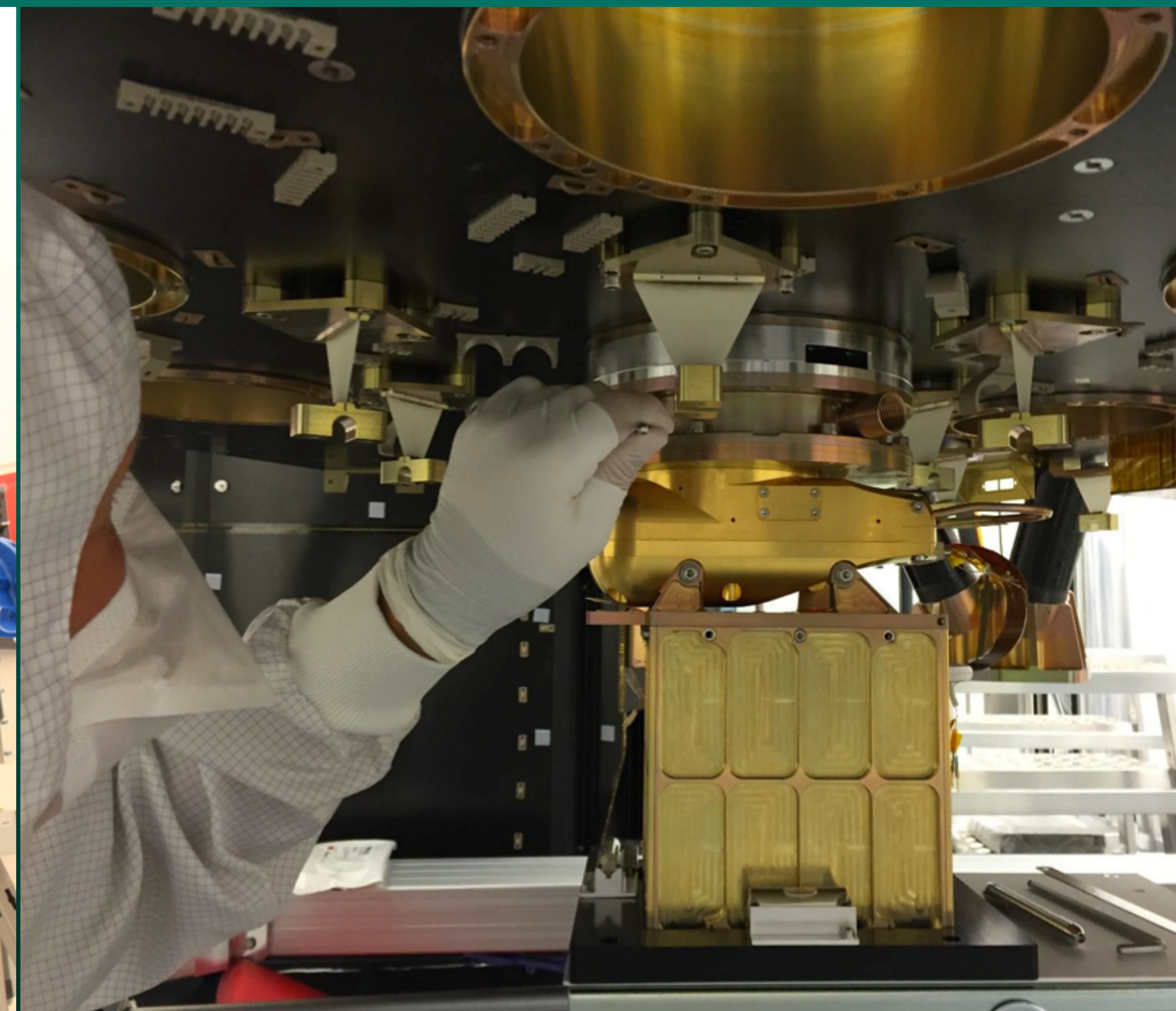


Merloni et al. (2012)

- **Launch:** Autumn 2018 from Baykonour to L2
- **4 years:** 8 all-sky surveys
- **3.5 years:** Pointed observation phase

eROSITA - Mirror and Camera Assemblies





http://www.mpe.mpg.de/450698/news

- **Number of nested mirror shells:** 54
- **Field of view:** 1 deg^2
- **Energy range:** 0.3-10 keV

Galaxy clusters

http://chandra.harvard.edu/photo/2008/a1689/

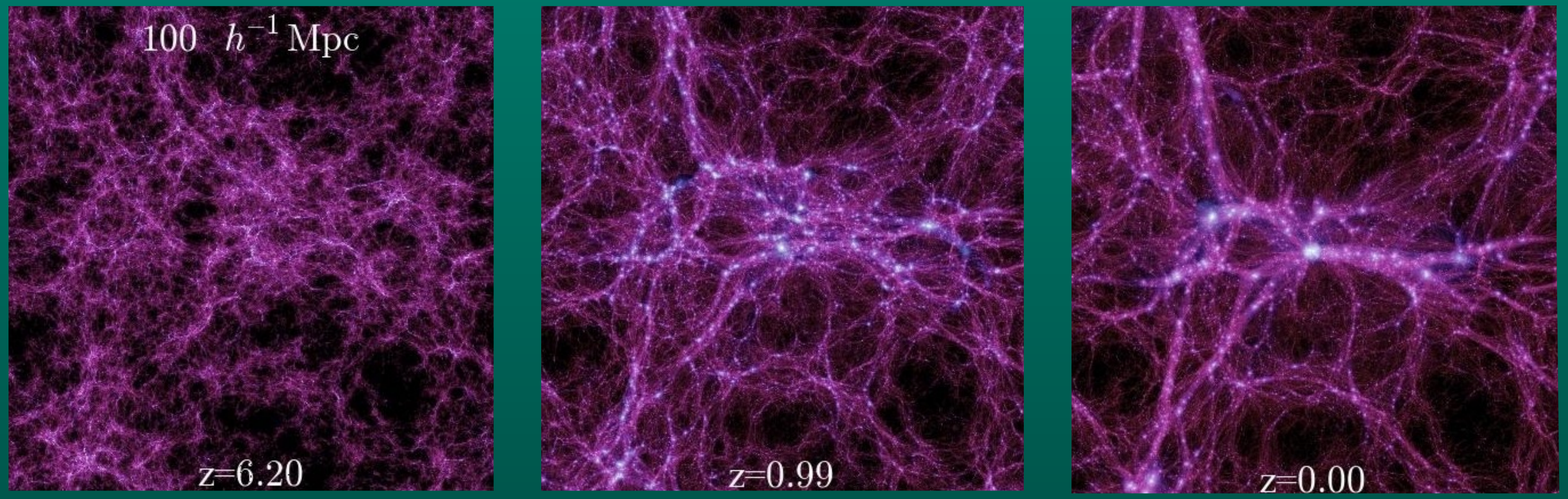
- **Galaxies:**
  100-1000

- **Temperature:**
  1-15 keV

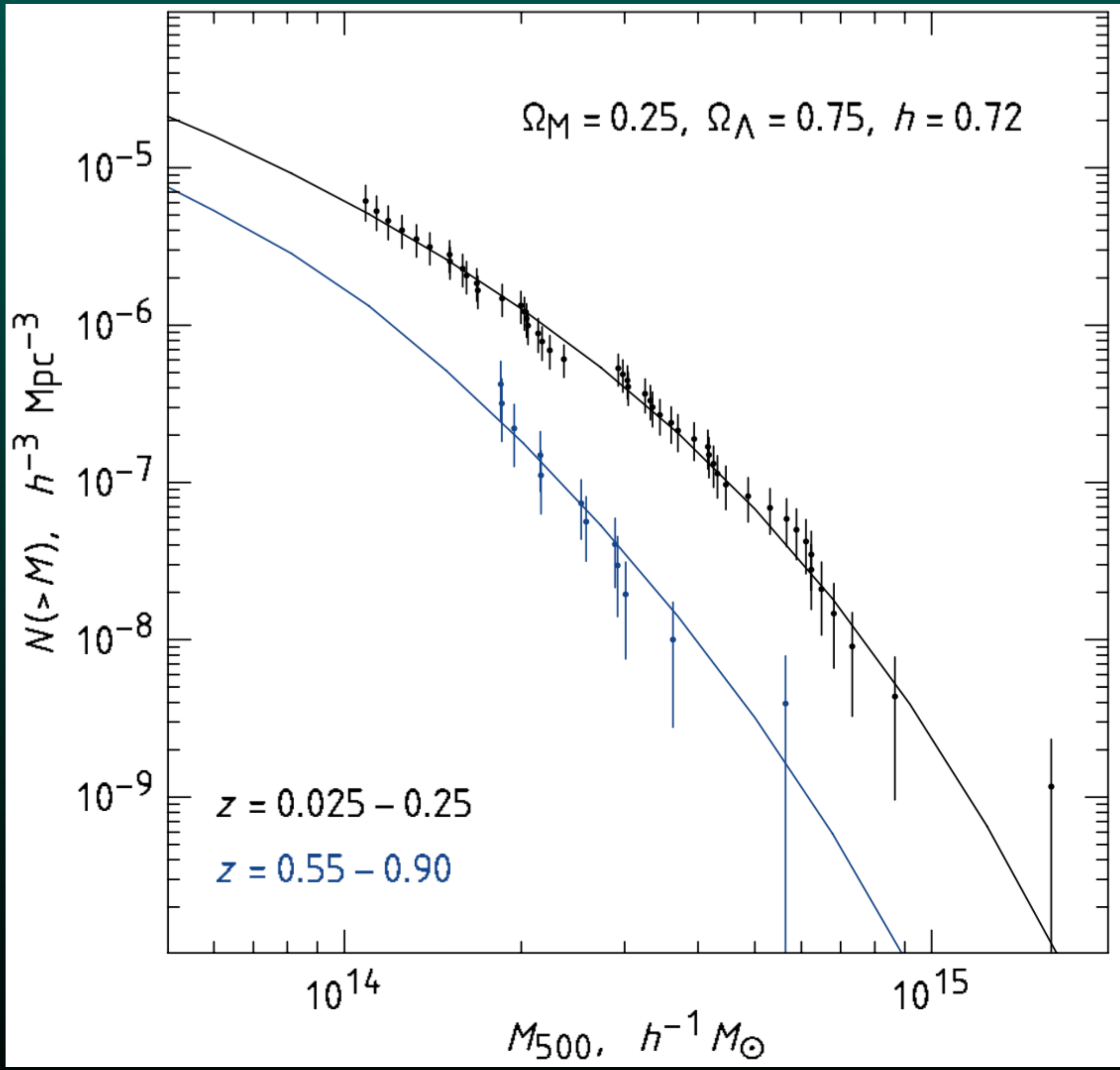
- **Mass:**
  10^{14}-10^{15} $M_{\odot}$

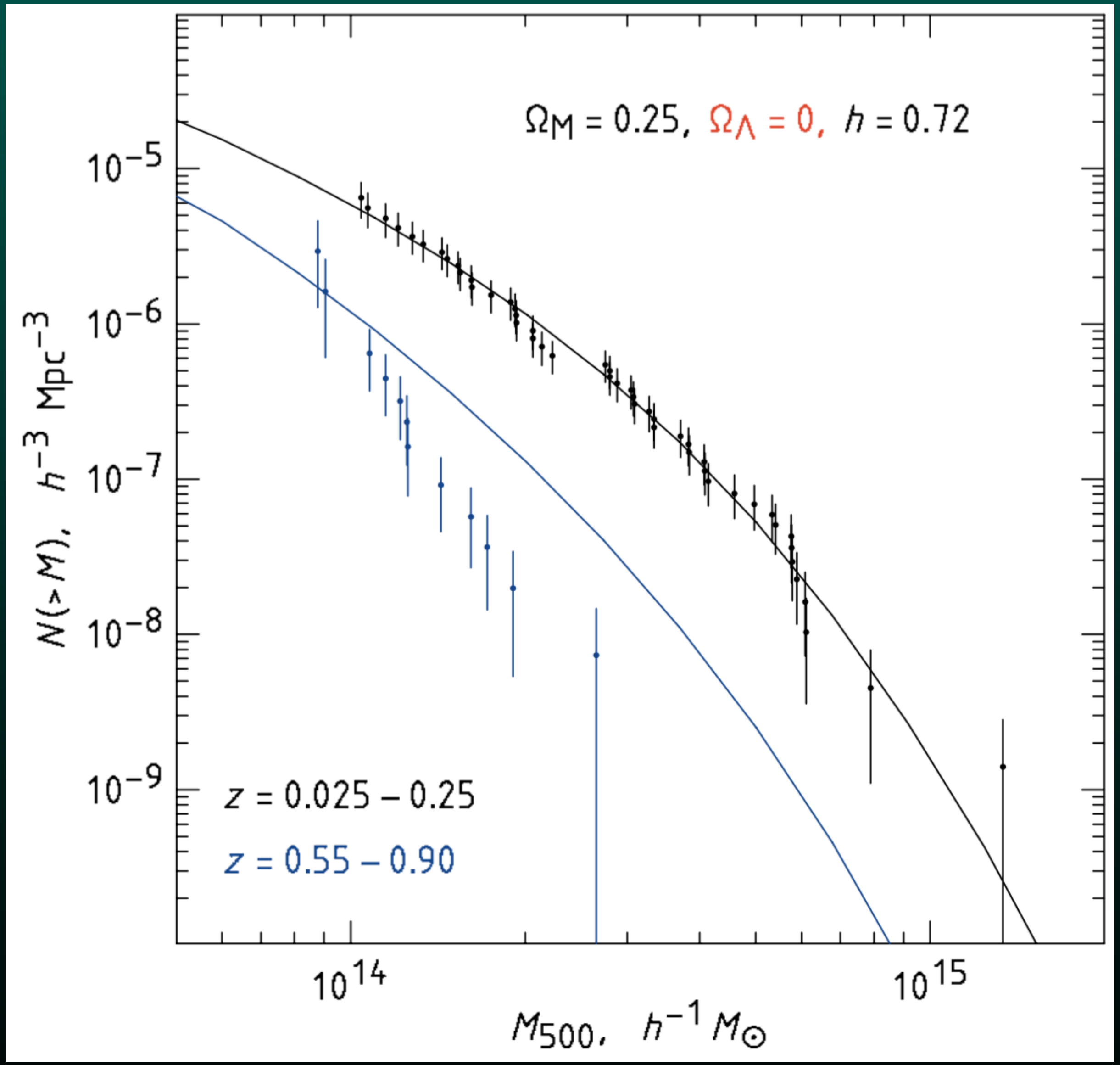
- **Composition:**
  Dark matter: 84%
  Baryonic: 16%
  (85% in form of hot ICM)

Galaxy cluster evolution & mass function



Boylan-Kolchin et al. (2009)



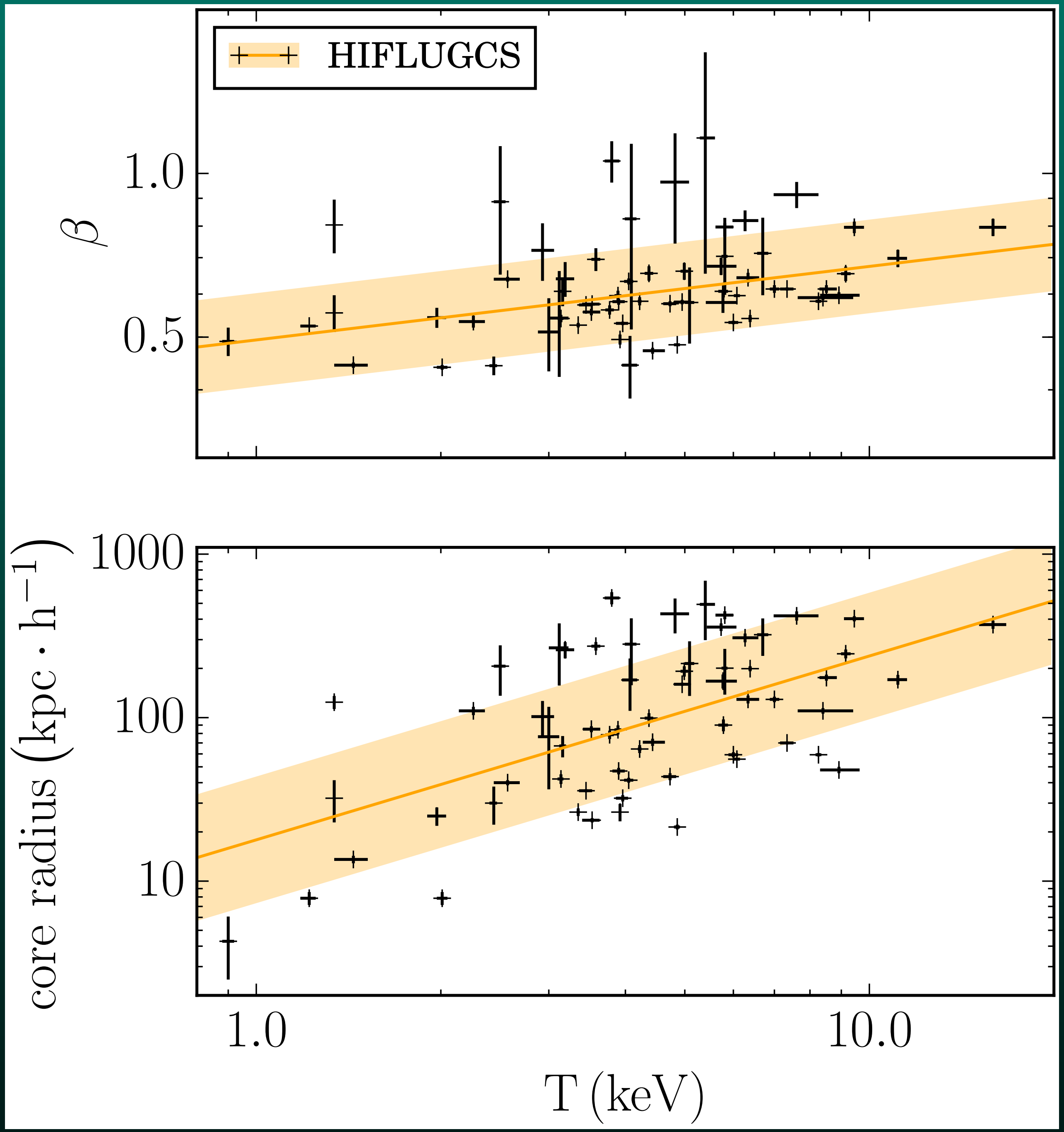


Vikhlinin et al. (2014)

Motivation

- Selection effects would lead to a distorted recovered mass function and therefore wrong cosmological results
- Very extended sources are detected less efficiently and compact sources can be mistaken for point sources
- We need a better understanding of the eROSITA selection function!
- The extended source detection probability depends on the cluster shape
- β: ~slope   core radius (r_c): ~extend

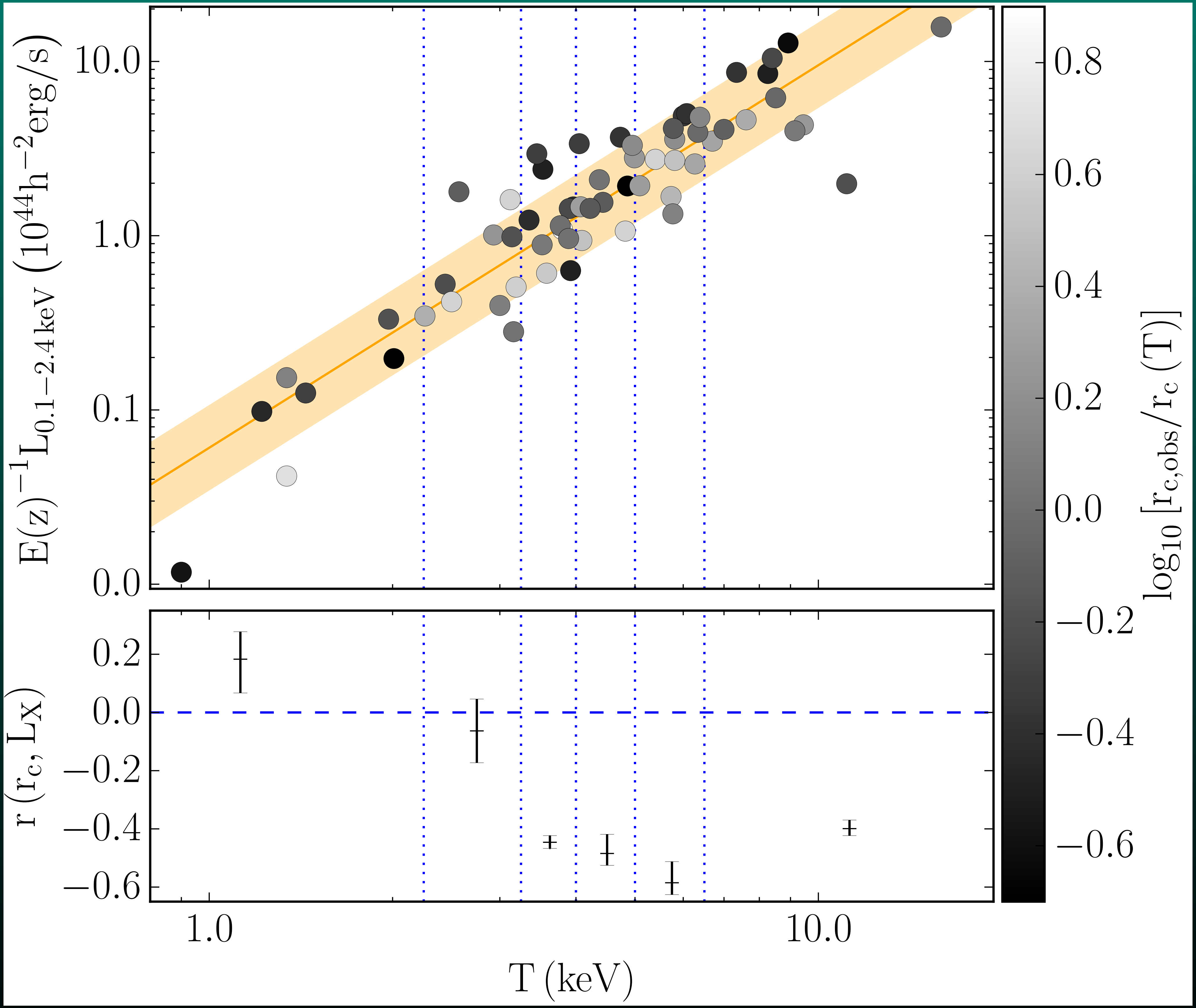
Shape scaling relations



Käfer et al. (in prep.)

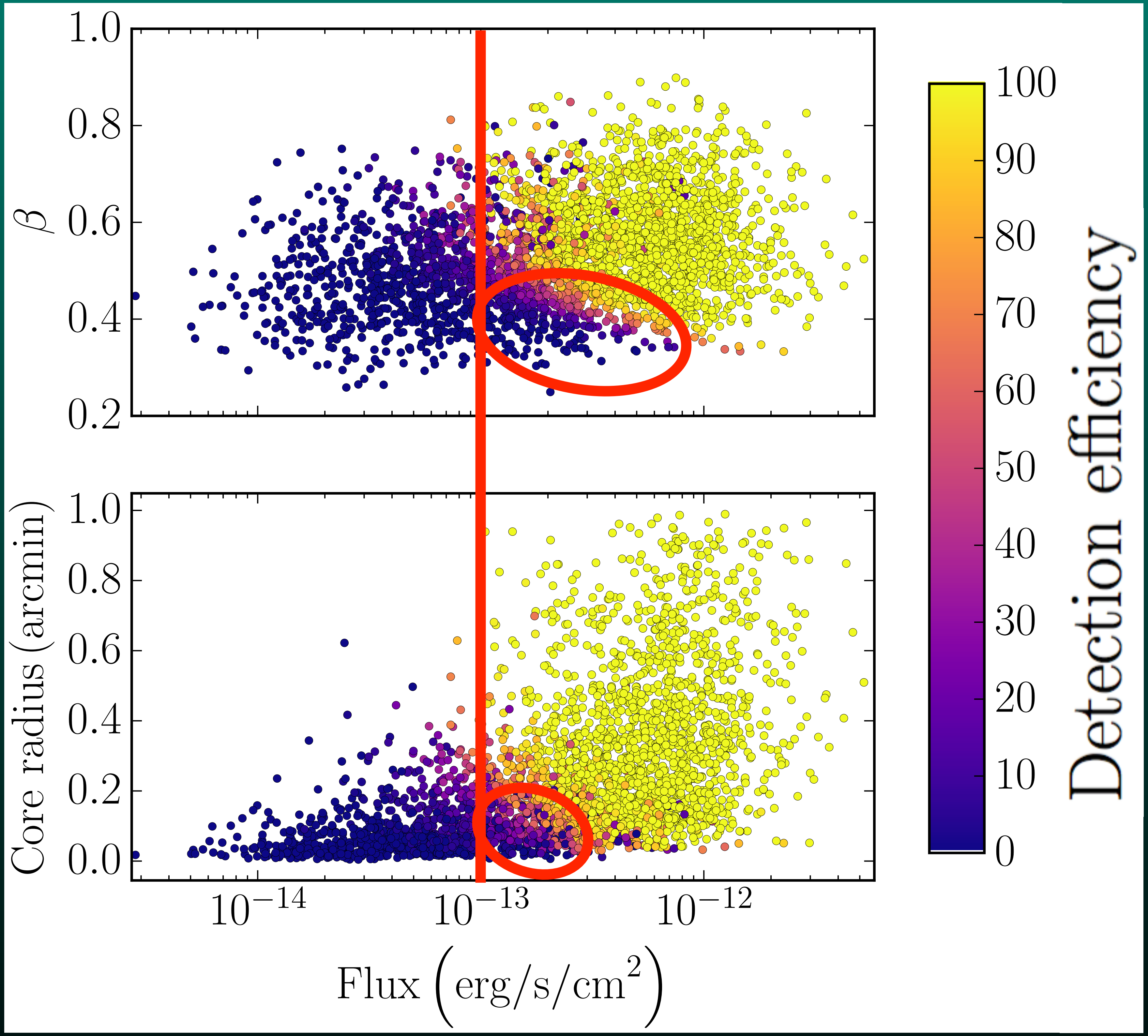
- β: ~slope core radius (r_c): ~extend

Scaling relations - Covariances



Käfer et al. (in prep.)

Selection effects



- β: ~slope

core radius (r_c): ~extend

Summary

- Cosmological results will depend on how well we know the eROSITA survey selection function
- Covariances between galaxy cluster parameters are important for source detection
- The extended source detection probability is not just a simple function of source flux