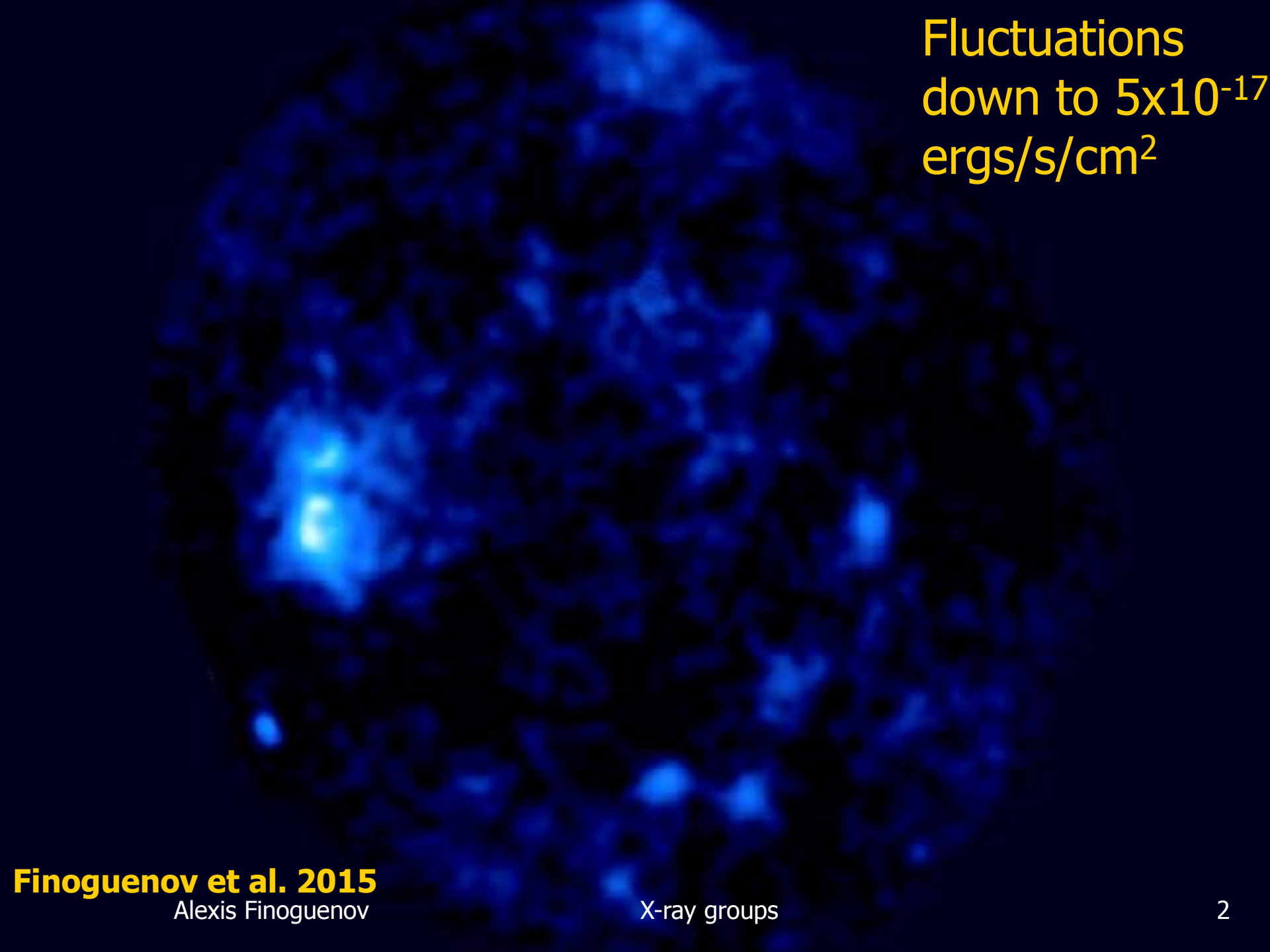
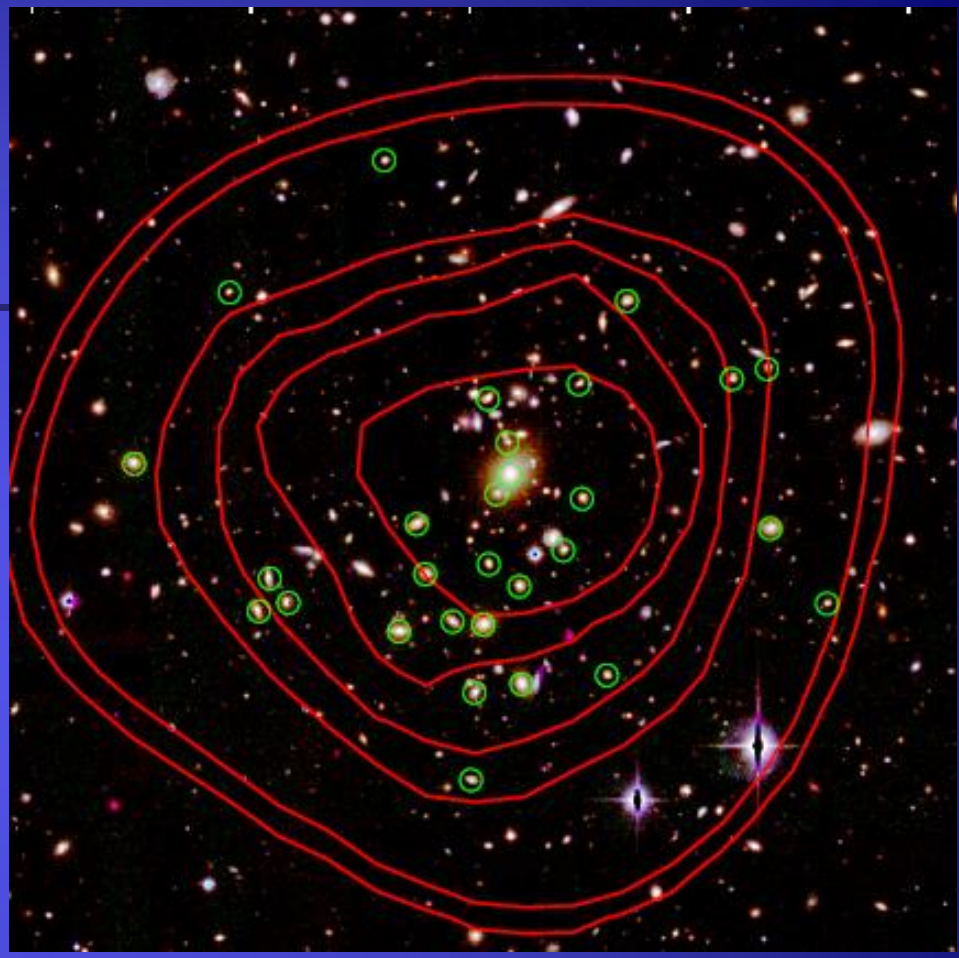
Galaxy groups in ultradeep X-ray fields

Alexis Finoguenov



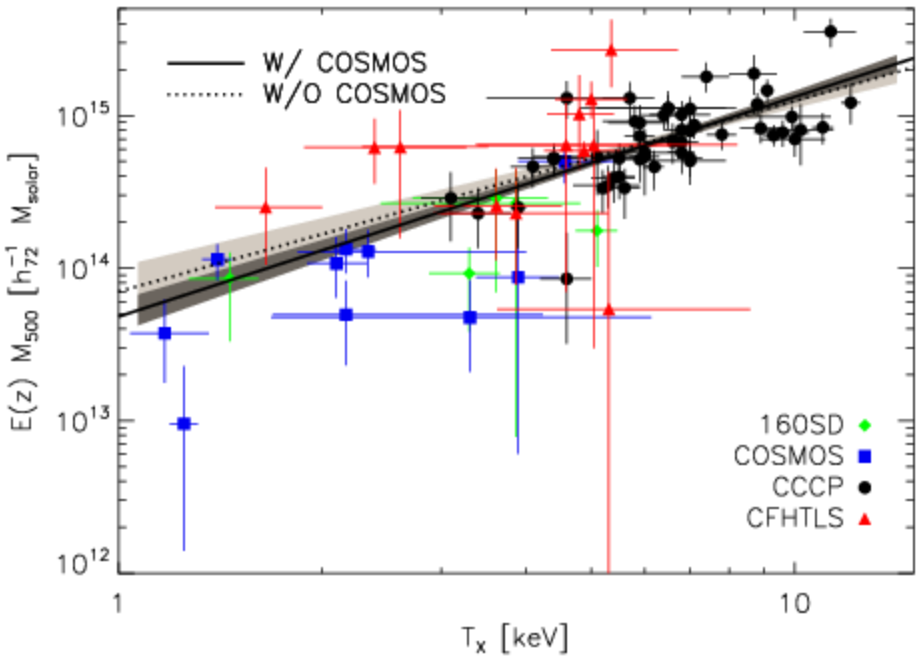
Finoguenov et al. 2015

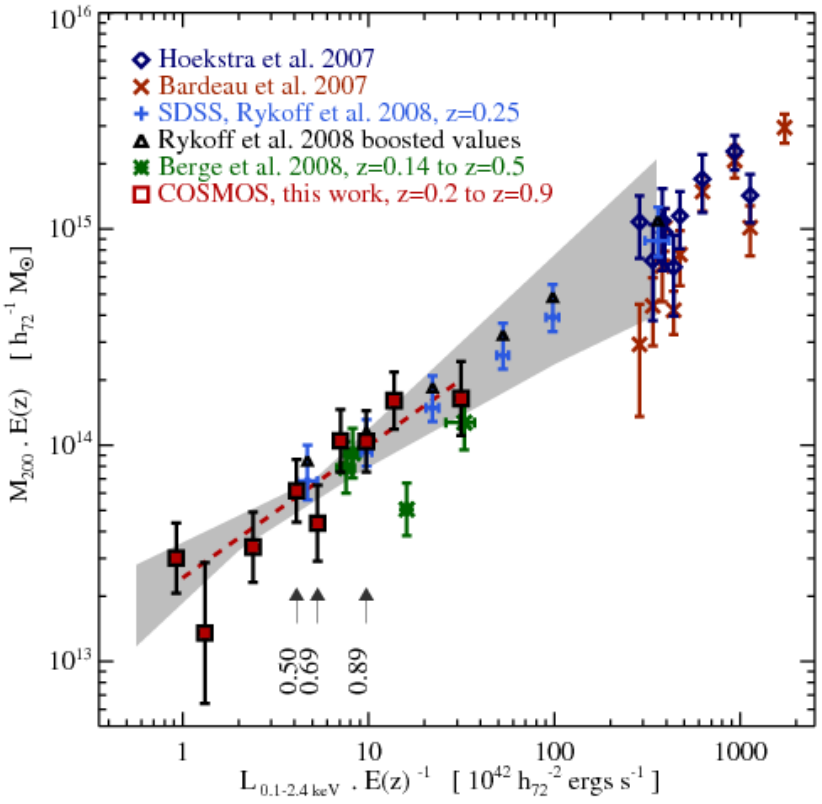
Extended X-ray emission from groups



- Selection is independent of galaxy properties
- Virialized halo with Lx tracing total mass
- Surveys are both complete and deep
- Centering and halo size – better membership

Scaling relations from weak lensing

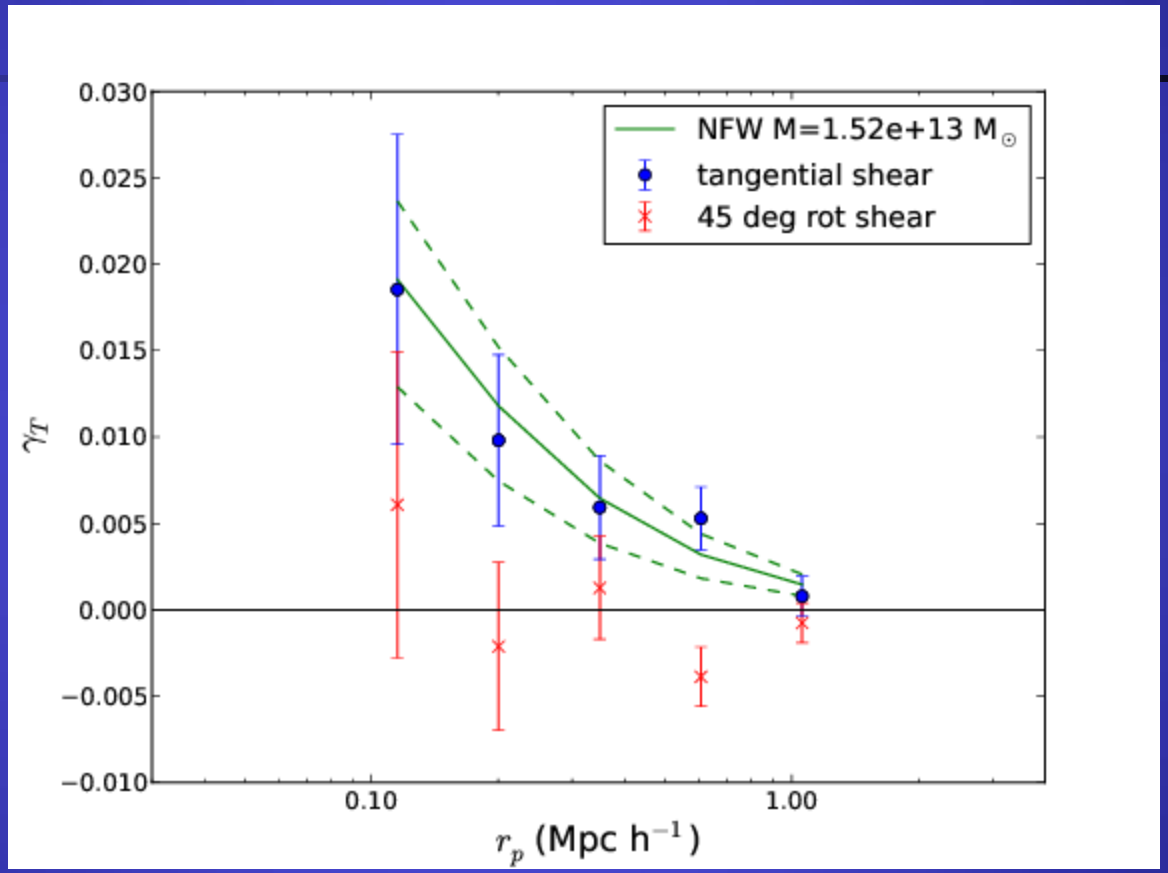




$$\frac{< M_{200}\ E(z) >}{M_0} = A \left(\frac{< L_X\ E(z)^{-1} >}{L_{X,0}} \right)^{\alpha} \qquad (13)$$

where $M_0 = 10^{13.7}\ h_{72}^{-1} M_\odot$, $L_{X,0} = 10^{42.7}\ h_{72}^{-2}\,\mathrm{erg\,s^{-1}}$, and where the function $E(z) \equiv \sqrt[2]{\Omega_m (1+z)^3 + \Omega_\Lambda}$ rep-

Lx-Mass from weak lensing (GEMS)



lgM=0.6lgLx+C

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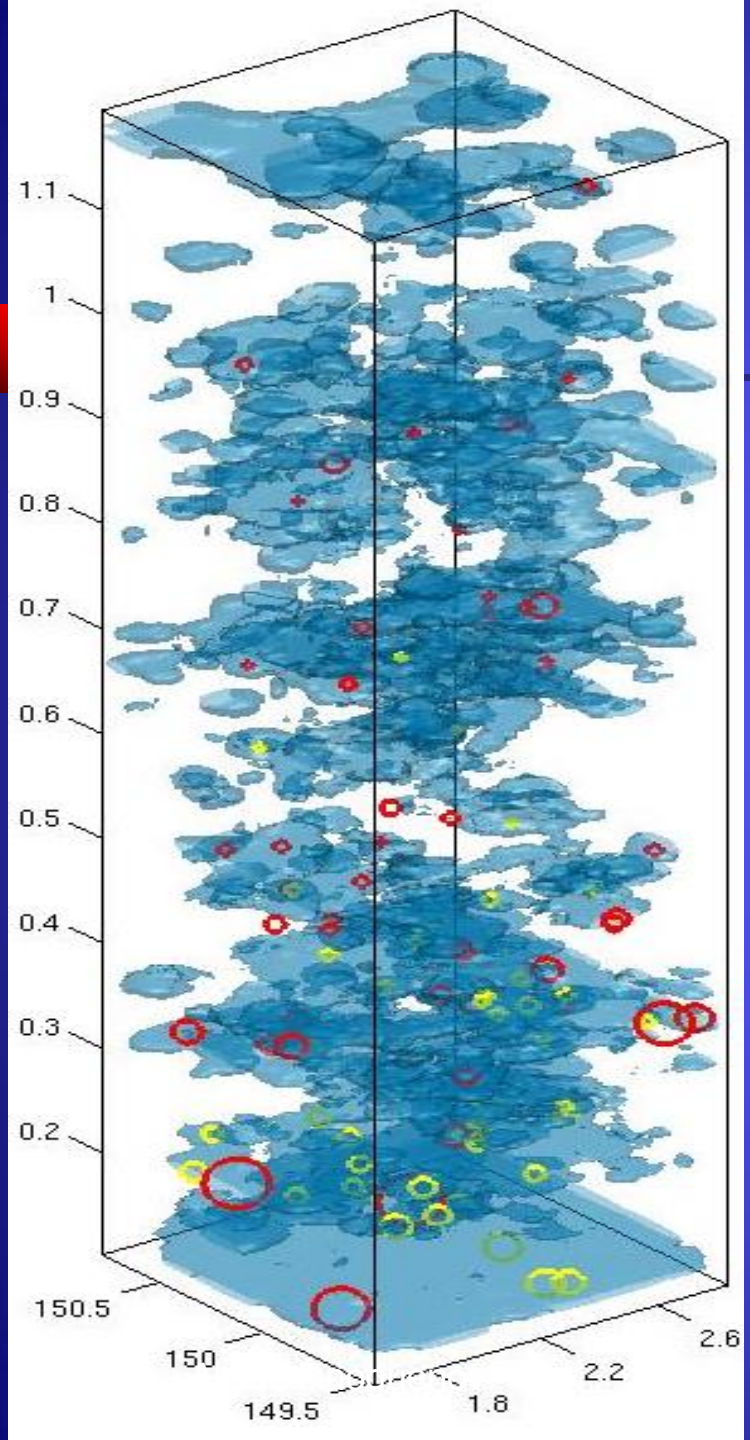
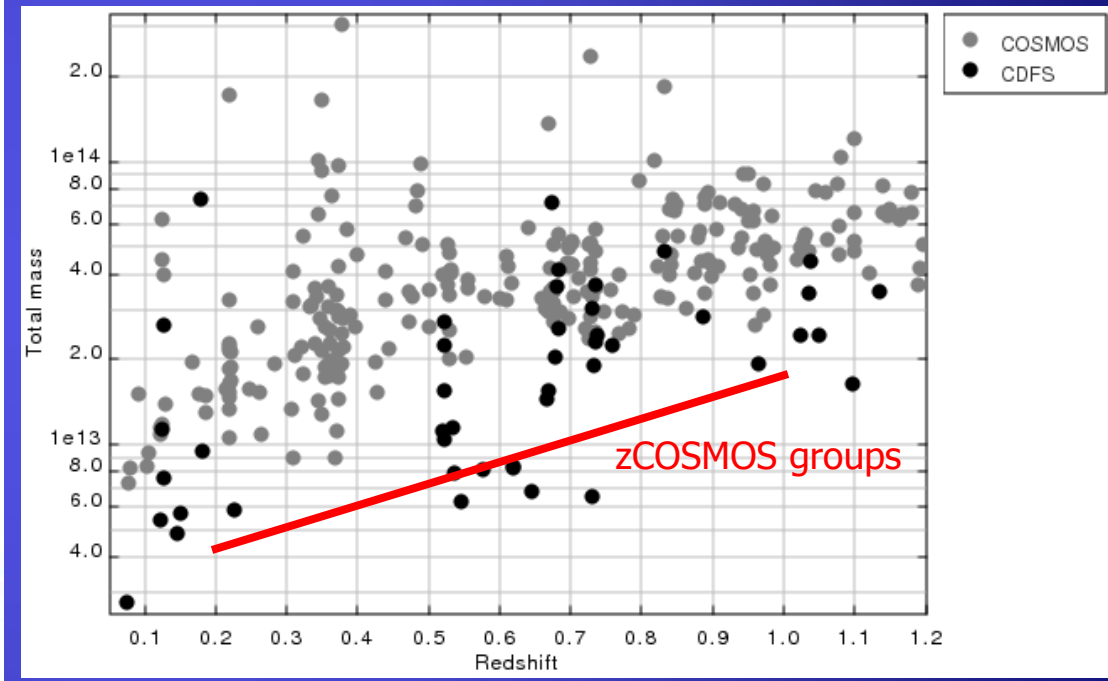
Ami Choi

X-ray groups

Galaxy groups and LSS

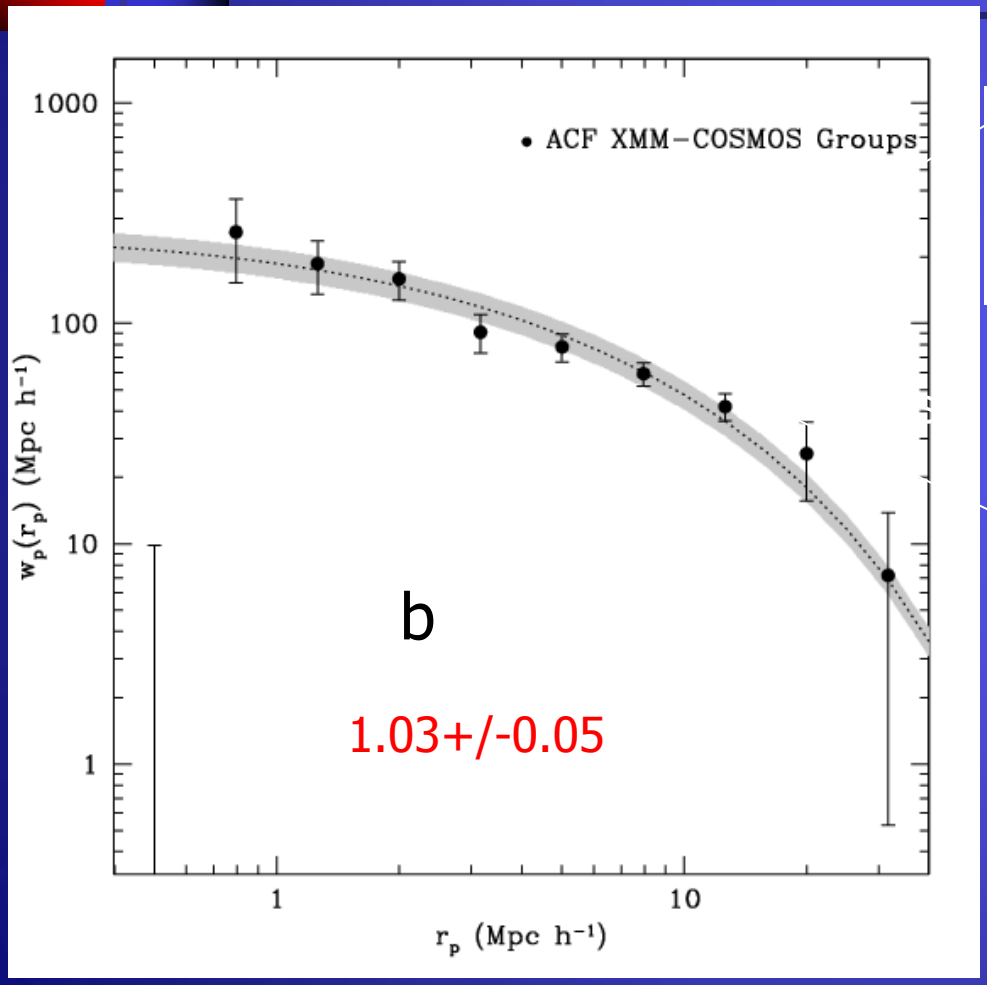


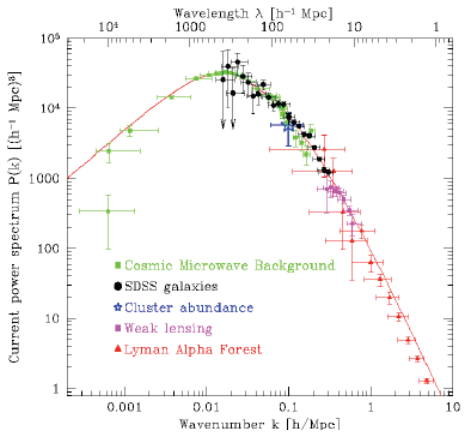


K.Kovac

LSS at 0.12, 0.22, 0.34, 0.37, 0.51, 0.73, 0.89

ACF and mass



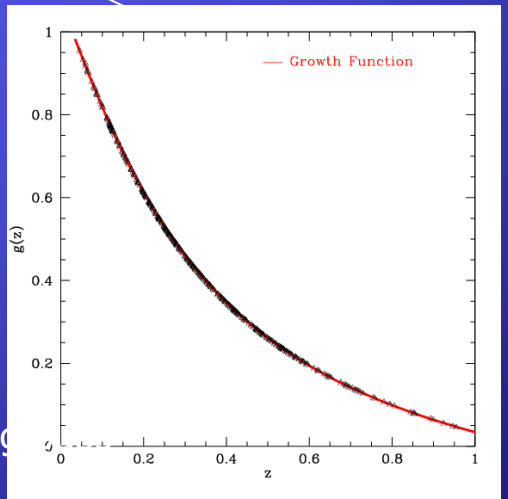


$$\bar{b}(M_0) = \sqrt{\frac{\sum_{i,j} b_i b_j g_{pair}}{N_{pair}}}$$

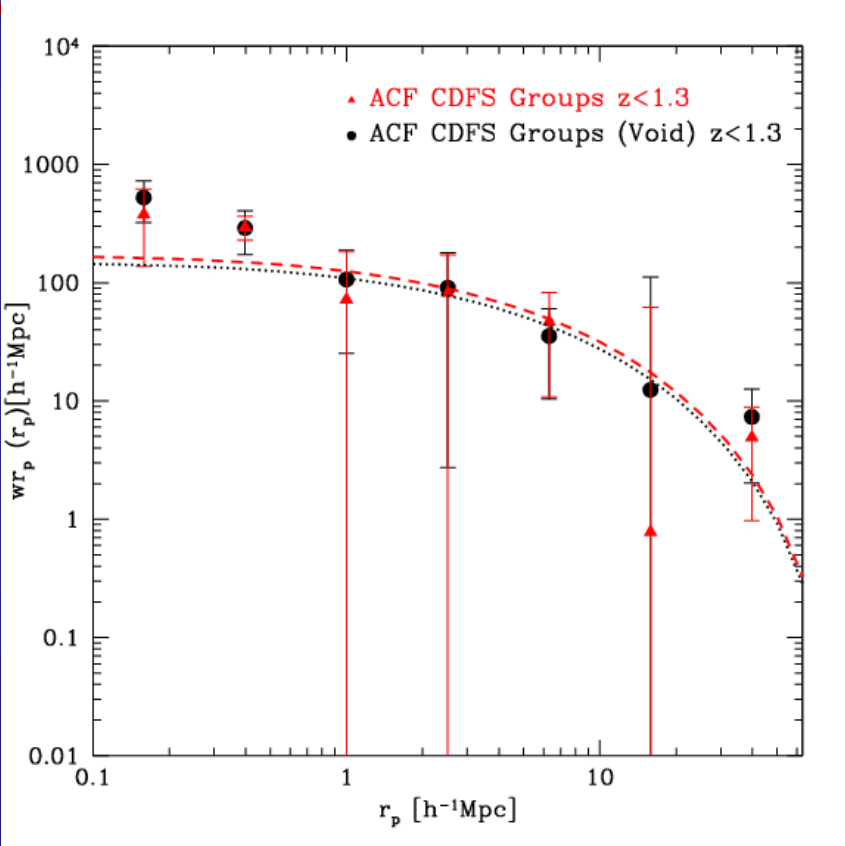
$$b_c = 1 + \frac{a\nu^2 - 1}{\delta_c} + \frac{2p/\delta_c}{1 + (a\nu^2)^p},$$

where A 0.322, a = 0.707 and p = 0.3.

Allevato, AF, et al. 2012

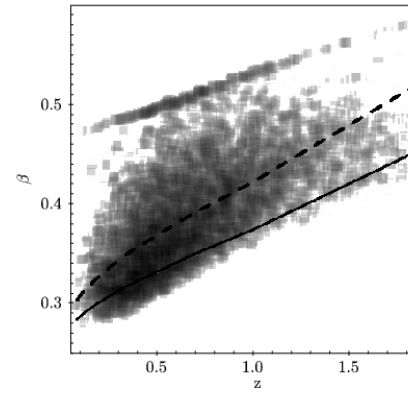


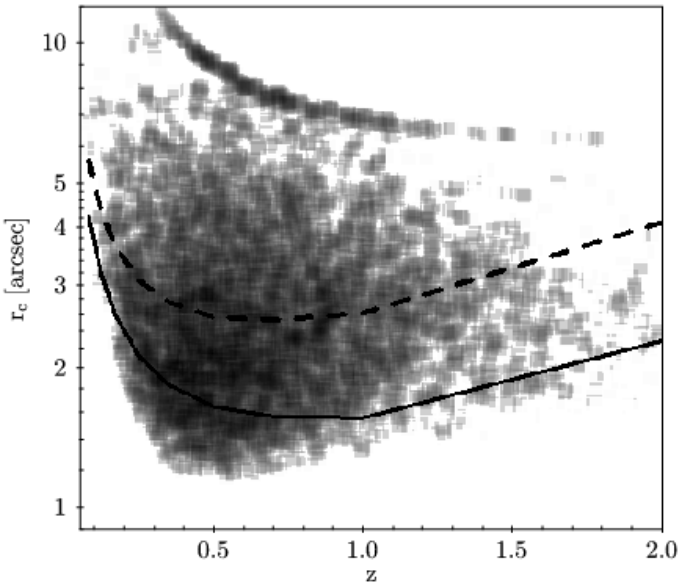
ACF of galaxy groups

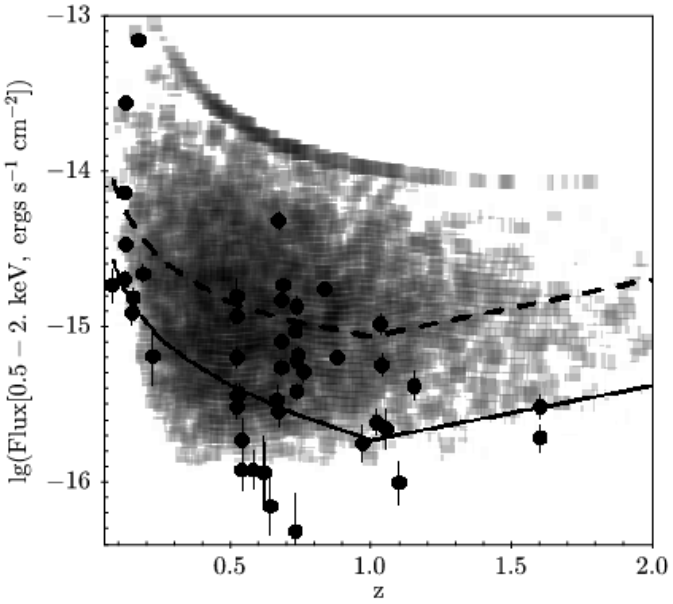


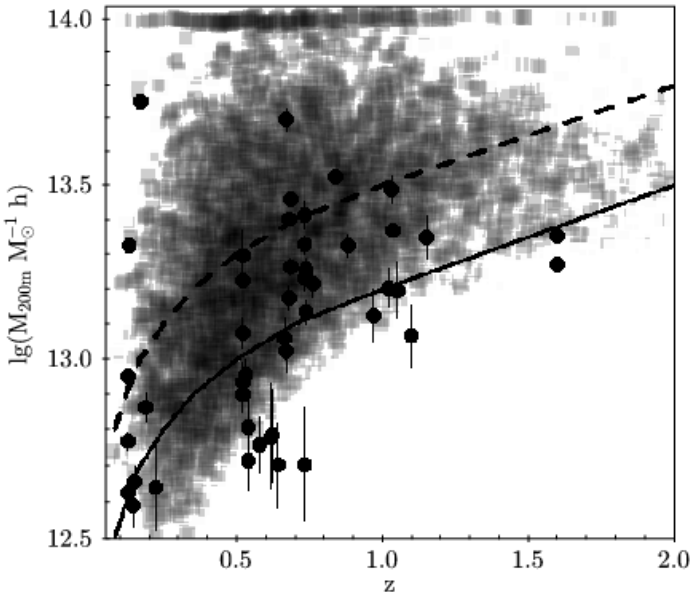
b_obs/b_model=1.1±0.1
This constraints the deviations from the assumed scaling relation to be < 30% in total mass.

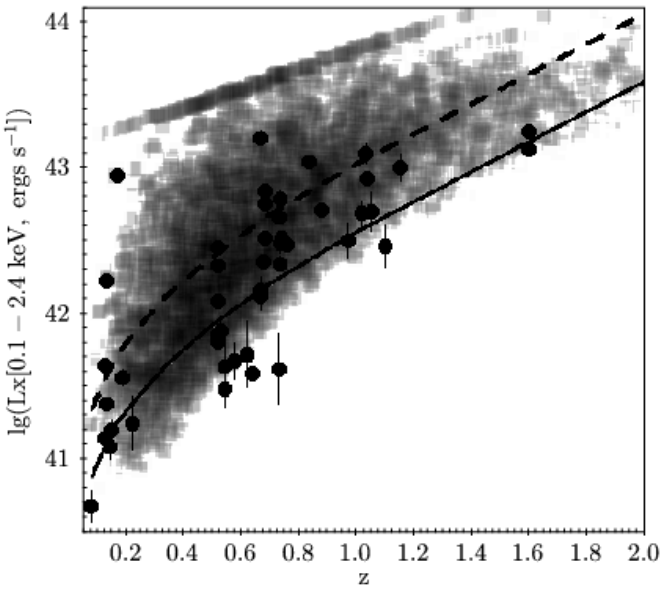
AF+'15 Statistics & Modelling

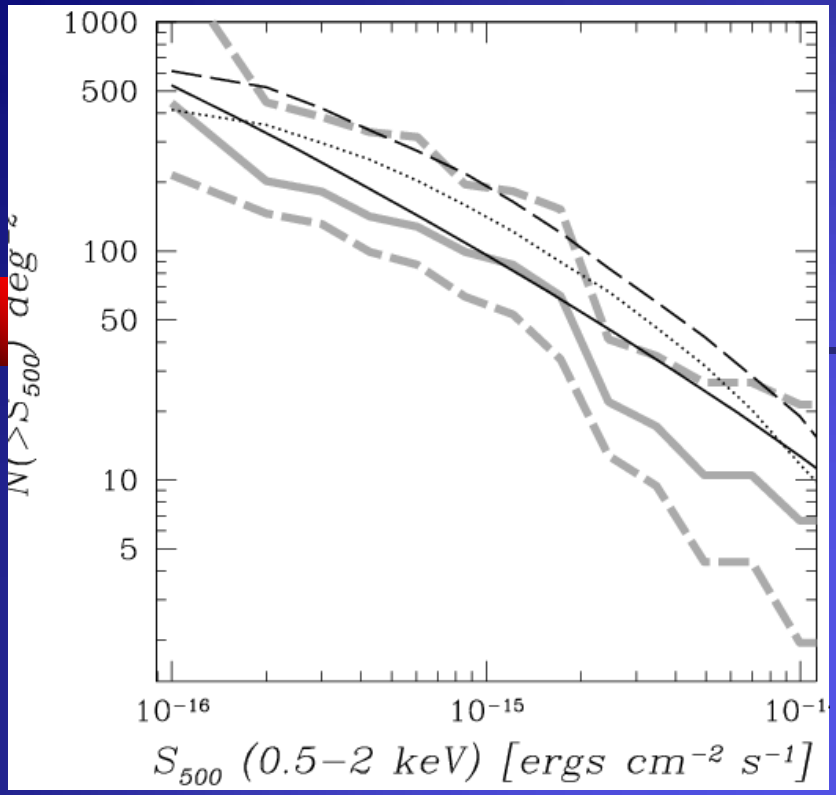


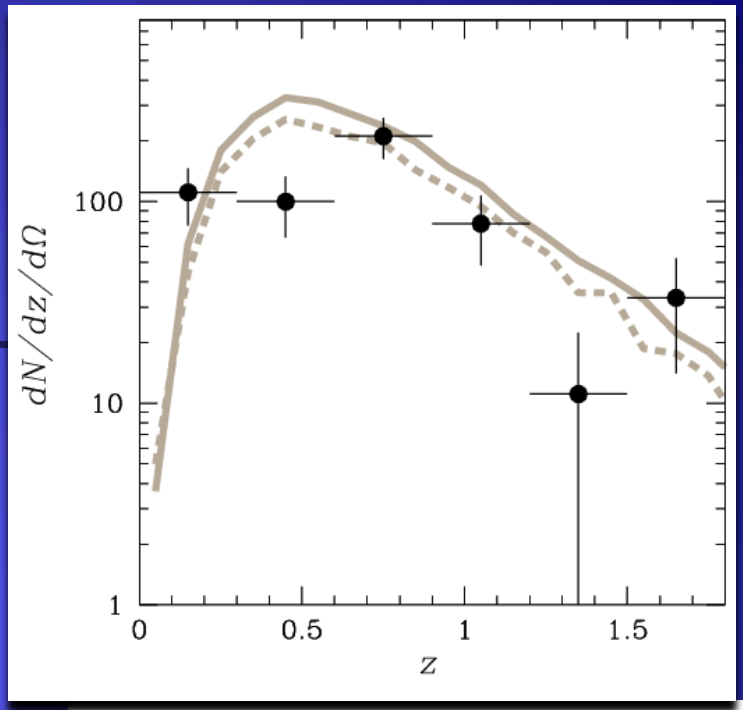






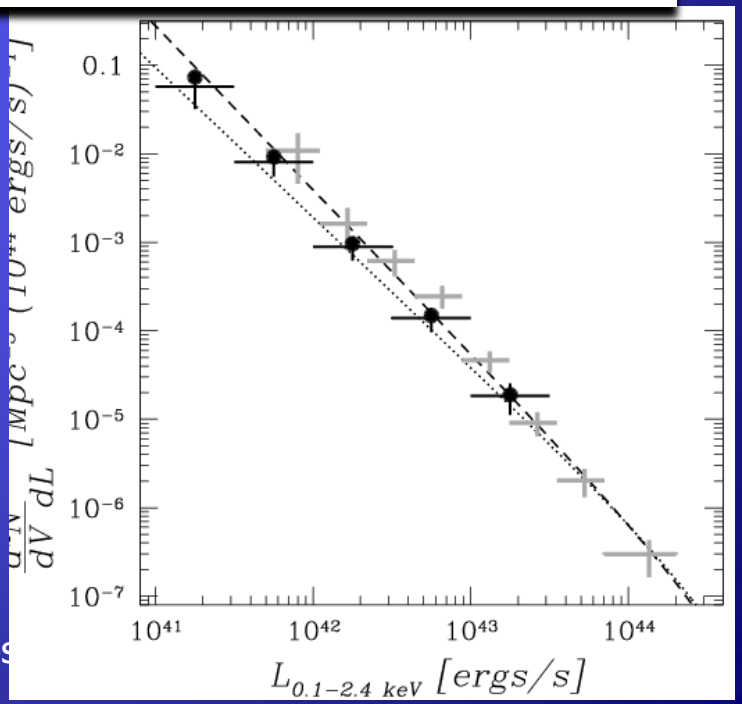




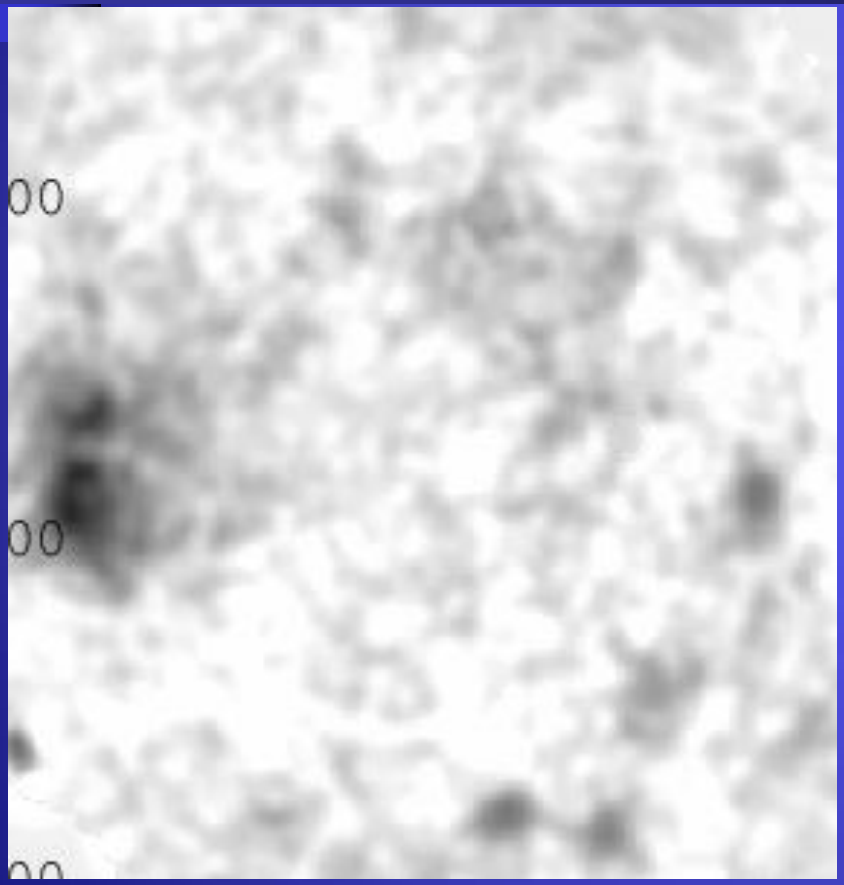


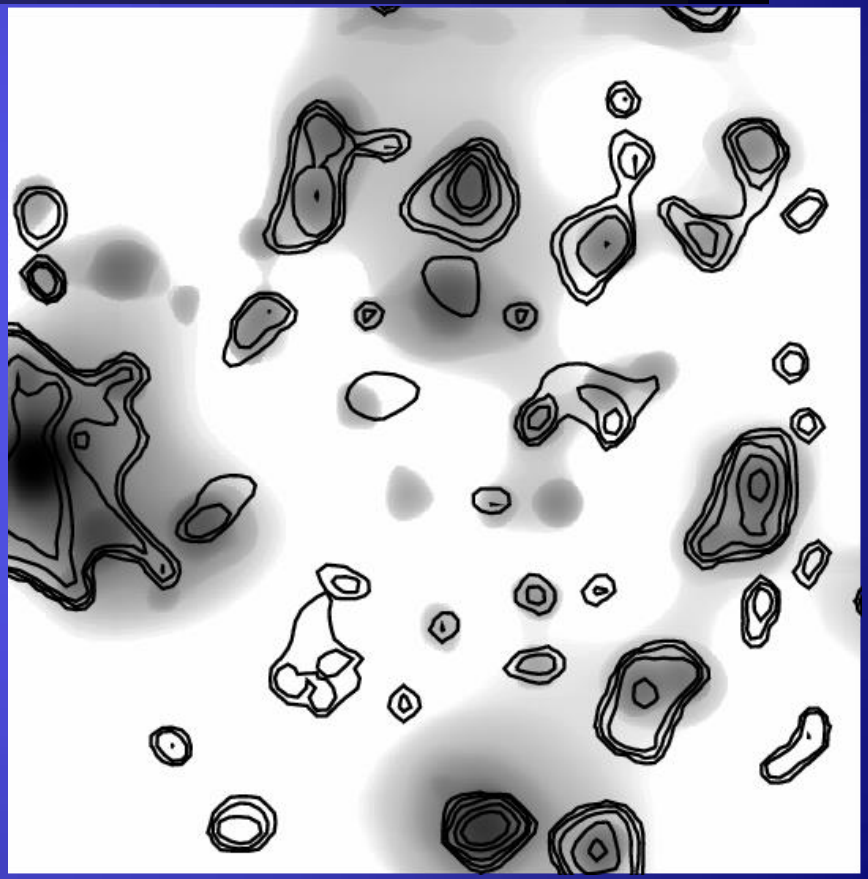
Groups vs LCDM

Finoguenov et al. 2015



Reproducing the observed emission

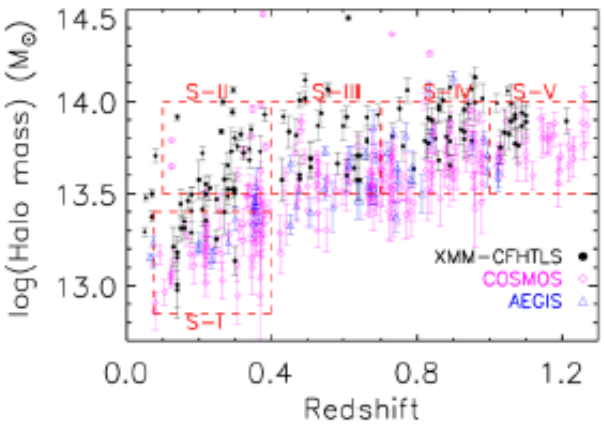


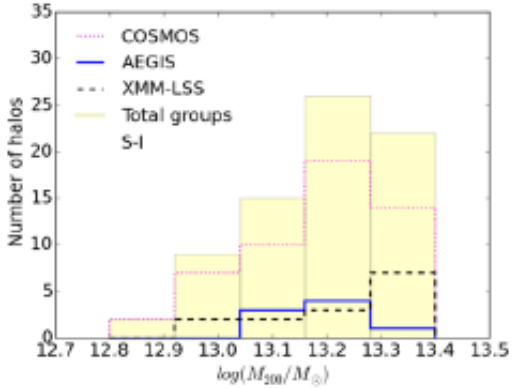


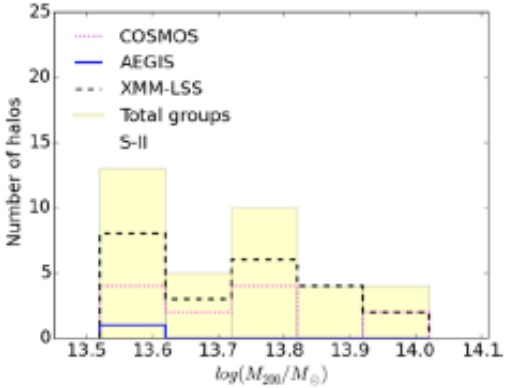
Finoguenov et al. 2015

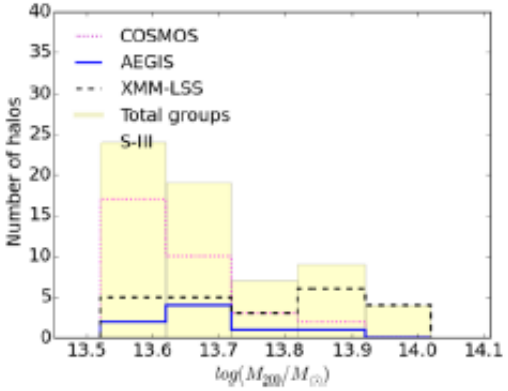
The combined sample of 450 groups

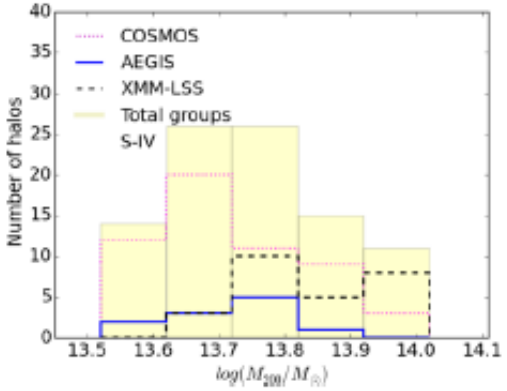
Gozaliasl, AF et al. 2015

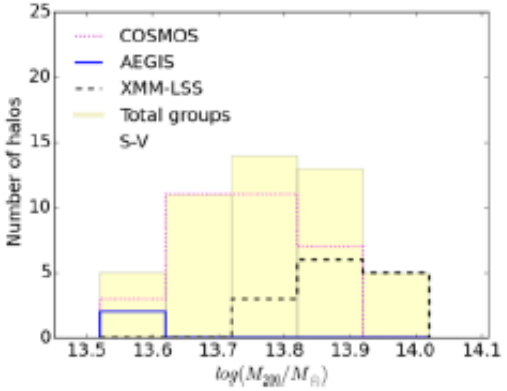






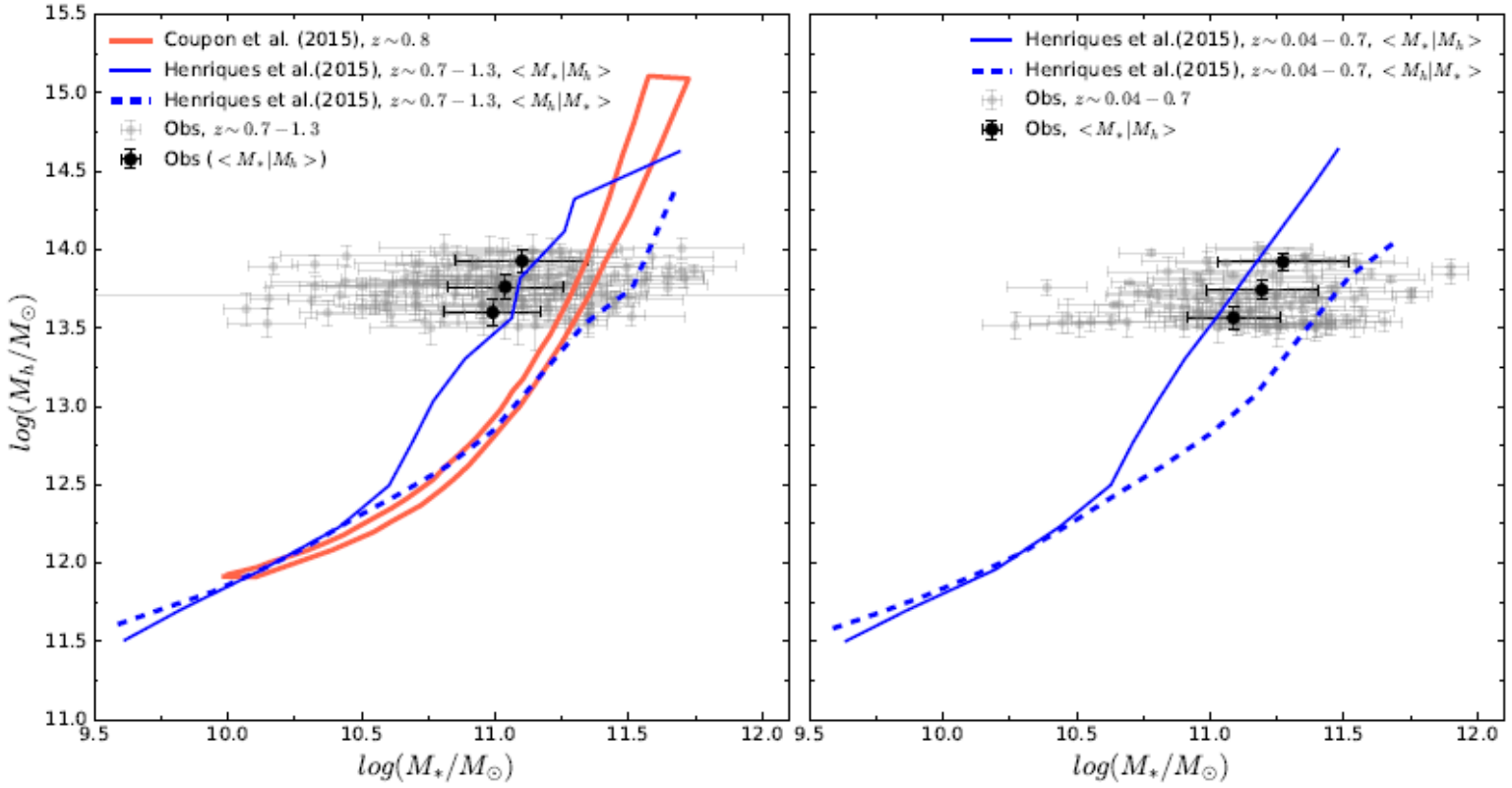




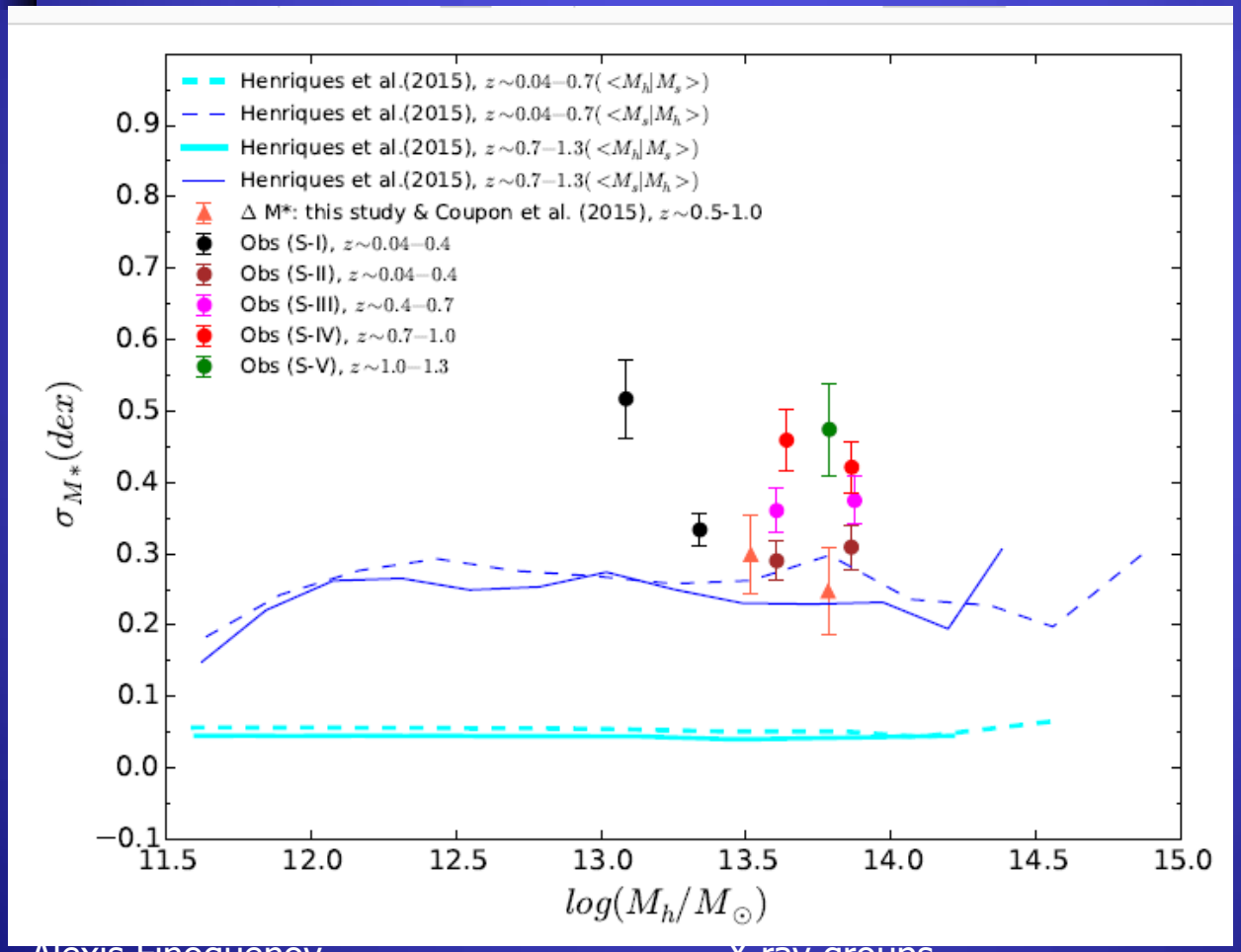


Differences in the way the stacking is done

Gozaliasl, AF, subm.



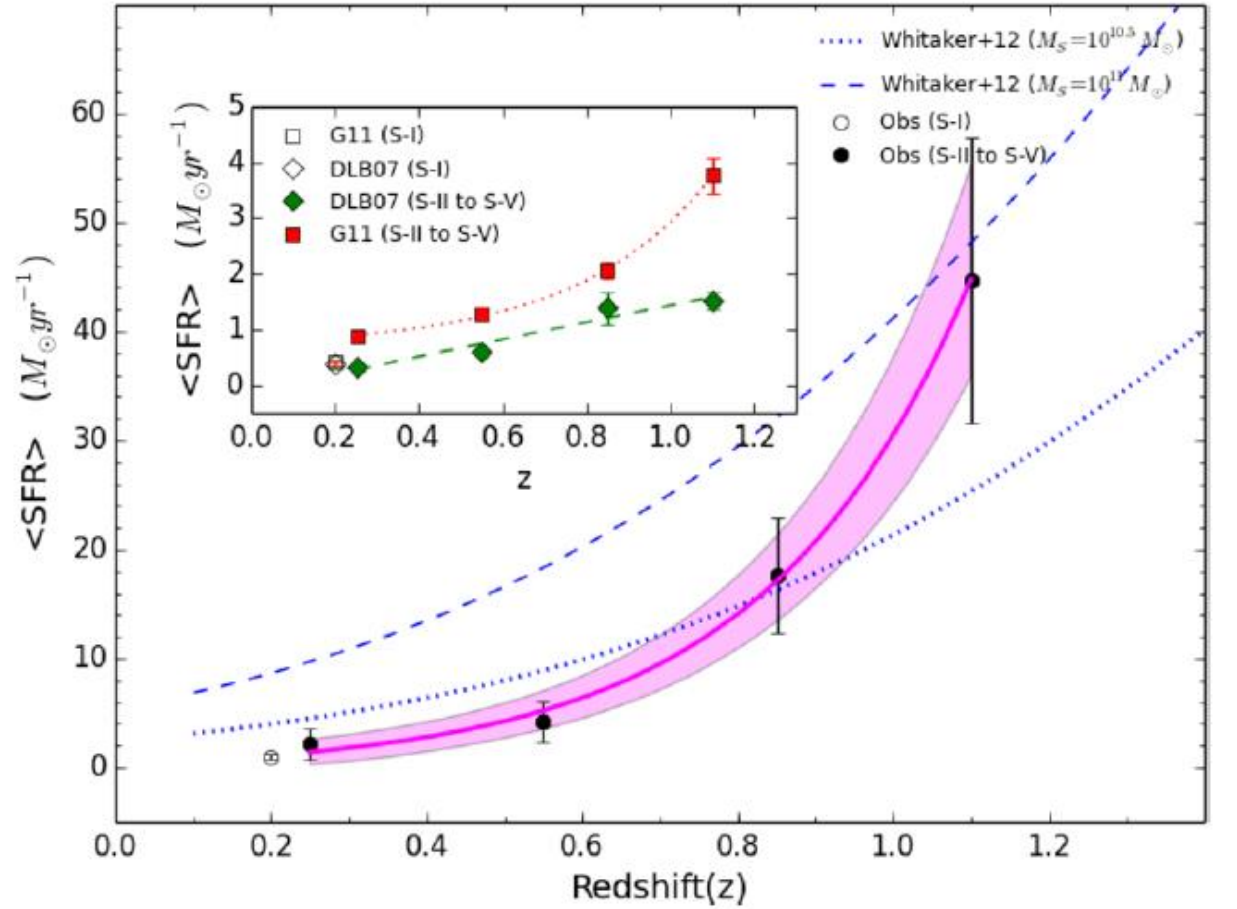
Constraining the scatter



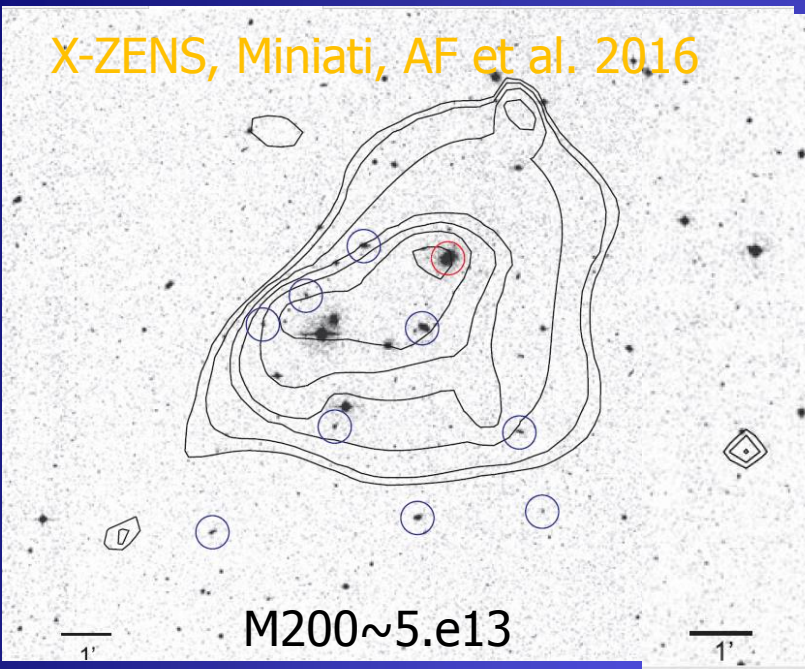
Gozaliasl, AF, subm.

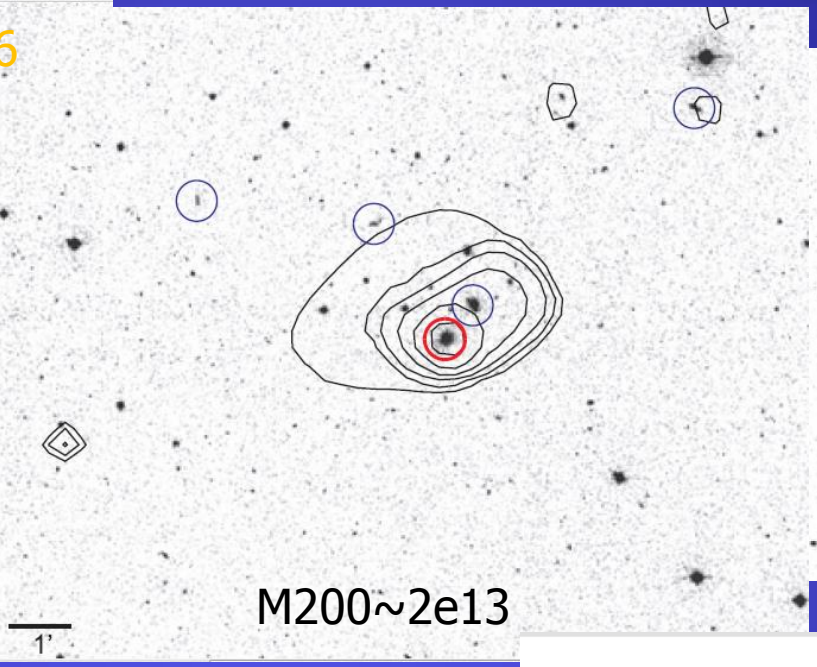
Gozaliasl, AF, et al. 2016

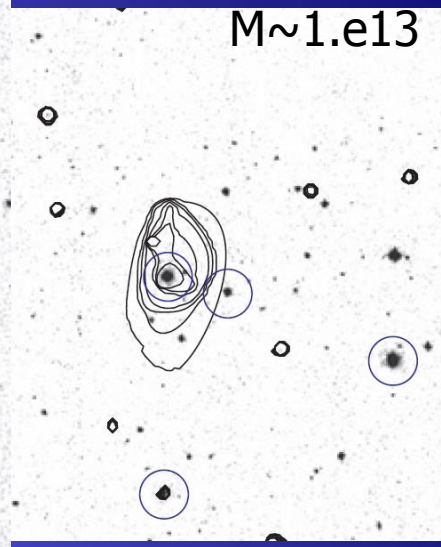
Evolution of BGG SFR



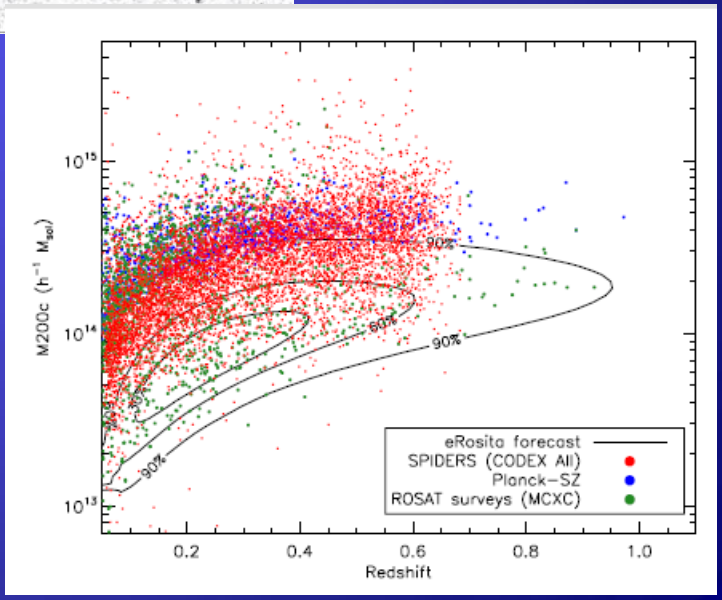
Galaxy groups with eROSITA







- 5.e13 Msun groups to z~0.3
- 2.e13 Msun groups to z~0.1
- Soft X-ray response down to 0.2 keV



Summary

- Deep surveys deliver a large population of massive groups allowing detailed studies of their multiwavelength properties, including mass calibration, BCG evolution
- Ultradeep fields obtain a unique population of very low mass groups, with masses reaching below 1.e13Msun
- eROSITA will contribute to understanding the variety of X-ray properties of galaxy groups