GALAXIES

Challenging but important areas of galaxy investigation
Few XMM (or Chandra) programs for galaxies (especially diffuse emission)

Extended halos of galaxies: early stage here (spiral and isolated early-type galaxies)
- Missing metals problem
- Hot mode accretion rate problem
- Range of hot halo mass (at fixed M_halo or M*)

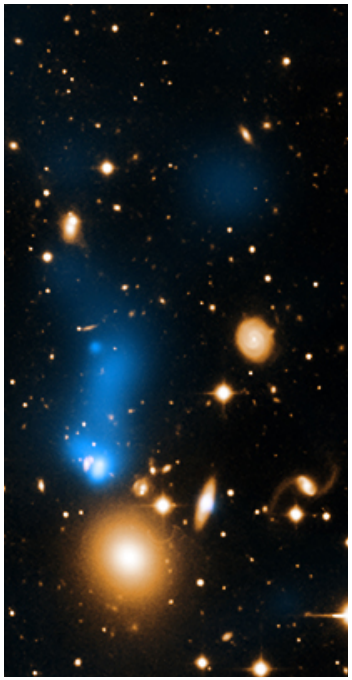
Environmental stripping of gas from galaxies (galaxy evolution; transition from blue to red cloud)
- Models and data are coming together nicely
- Limited range of parameter space probed

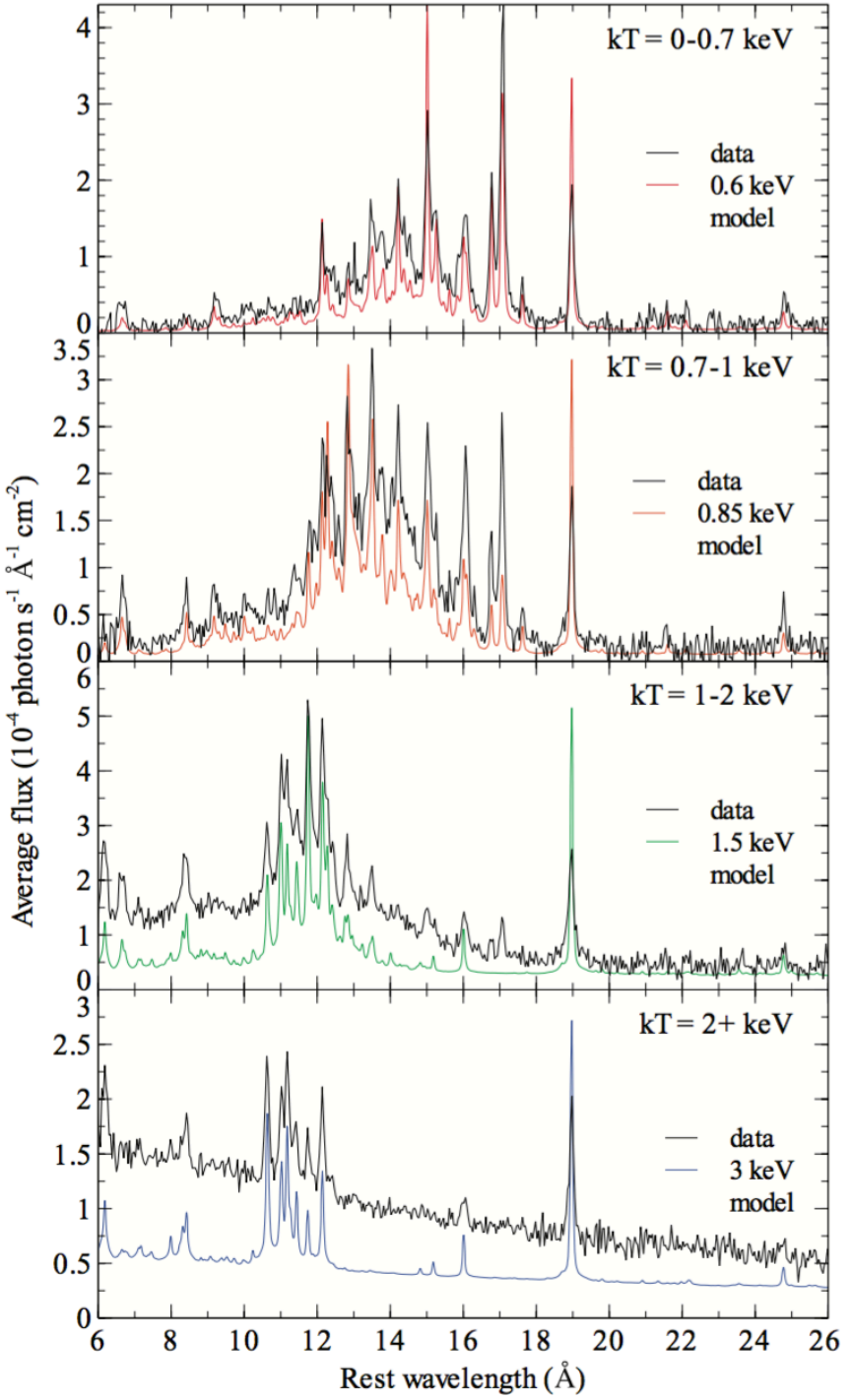
Disk activity feeding a galactic fountain
- Weak connection between theory and observation
- Observations deep enough for a sufficient range of systems?

Characterising the z>1.2 cluster population

- Critical for cosmology
- This is the epoch of cluster assembly
- Mismatch between IR and X-ray number counts
- Need to obtain very well selected samples
- Getting temperature requires a few 100 ks
- AGN contamination is critical at these z
- ➔ Joint XMM-Chandra VLP

- Gas in cluster outskirts still largely unexplored. *eROSITA* will do pointed observations only after the survey (>2021).
- *XMM-Newton* will stay the most efficient instrument for 5−10 keV clusters.
- Improve possibility to *systematically* find unexpected, rare (~<1%) but exciting phenomena with *XMM-Newton*. *eROSITA, Euclid, …* will provide the required parent samples, starting in 2018.
- Might require >3 Ms programs, possibly running over >2 cycles.





Stacked RGS Spectra (Sanders+11)

RGS cluster science

Metals

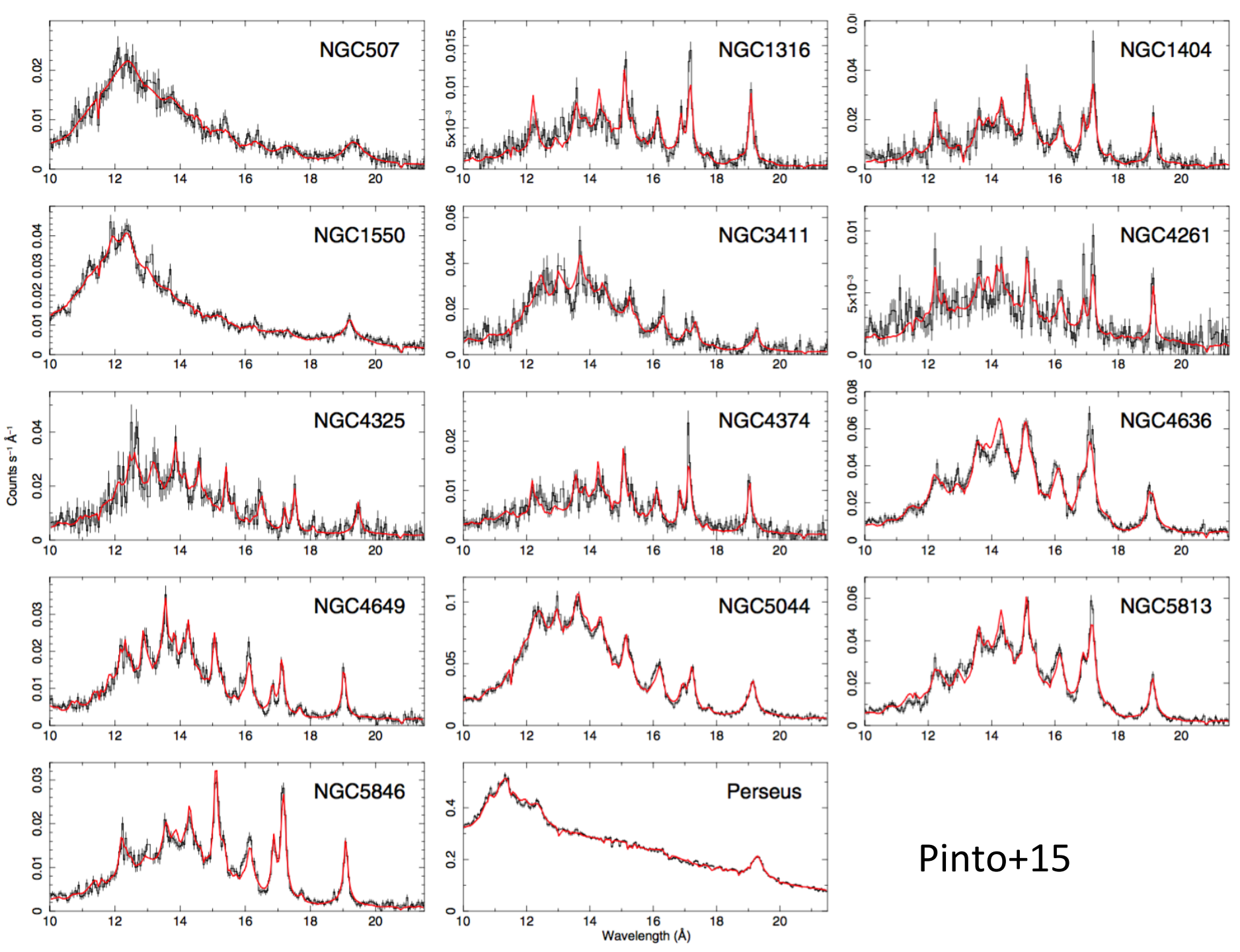
OVII emission

Velocities

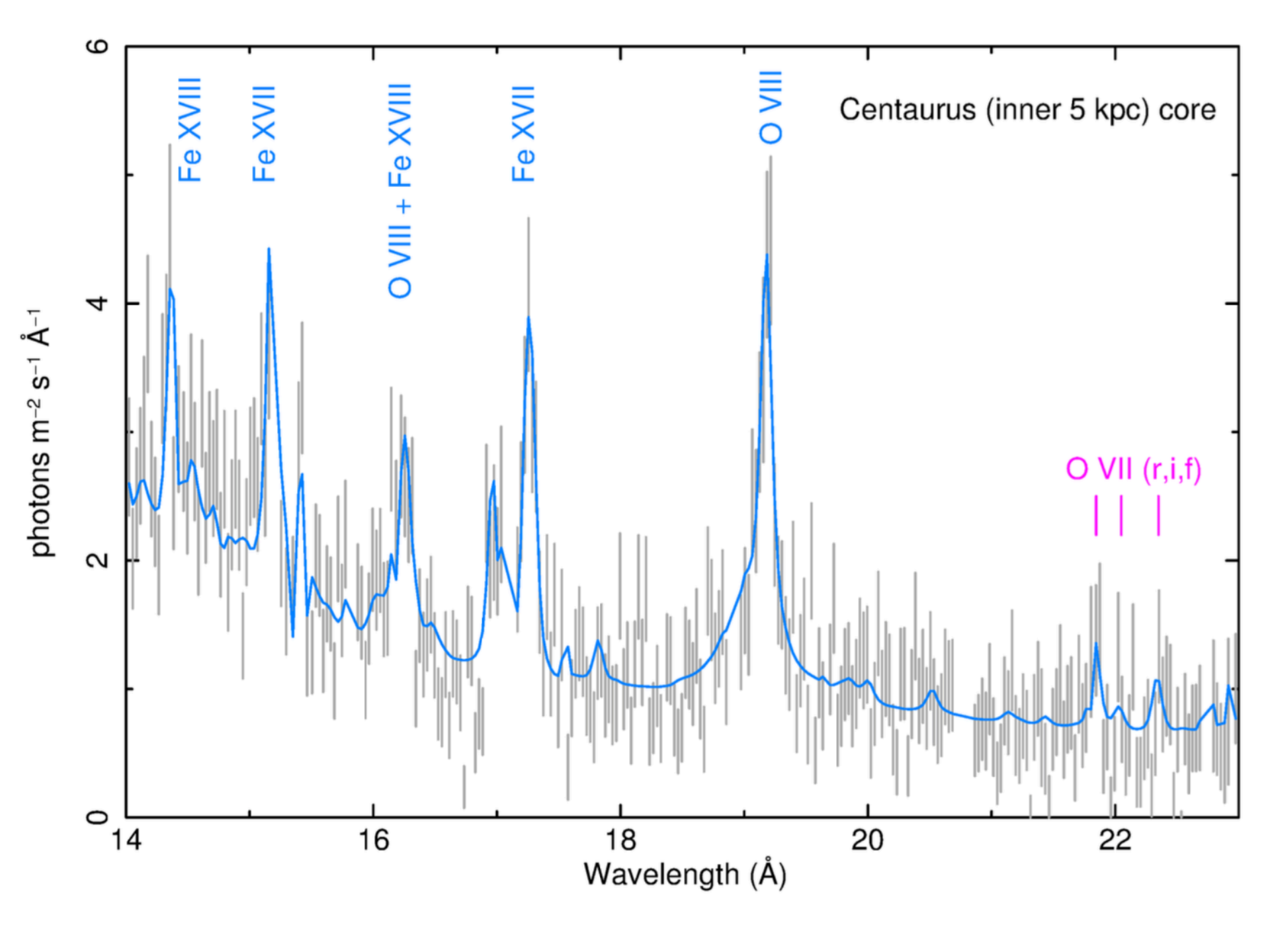
Most RGS targeted

Spectra are short,

Full power obtained with much deeper exposures


NGC507
NGC1316
NGC1404
NGC1550
NGC3411
NGC4261
NGC4325
NGC4374
NGC4636
NGC4649
NGC5044
NGC5813
NGC5846
Perseus
Counts s⁻¹ Å⁻¹
Wavelength (Å)

Pinto+15


Centaurus (inner 5 kpc) core
Fe XVIII
Fe XVII
O VIII + Fe XVIII
Fe XVII
O VIII
O VII (r,i,f)
photons m^{-2} s^{-1} Å^{-1}
Wavelength (Å)
0
2
4
6
14
16
18
20
22

SUMMARY

- Plenty left to do for XMM with Clusters and Galaxies

Further Suggestions

- Encourage TACs to look more favorably upon completing "the last 10% of the sample." The naive $\sqrt{N}$ argument often does not apply for well-selected samples.
- Require minimum (flare-corrected) exposure of ~>6 ks – unless specially justified, e.g., for variability studies – since *eROSITA* will have ~1.6 ks anywhere.
- Increase efficiency by observing low-surface brightness objects at low-flare-risk periods.