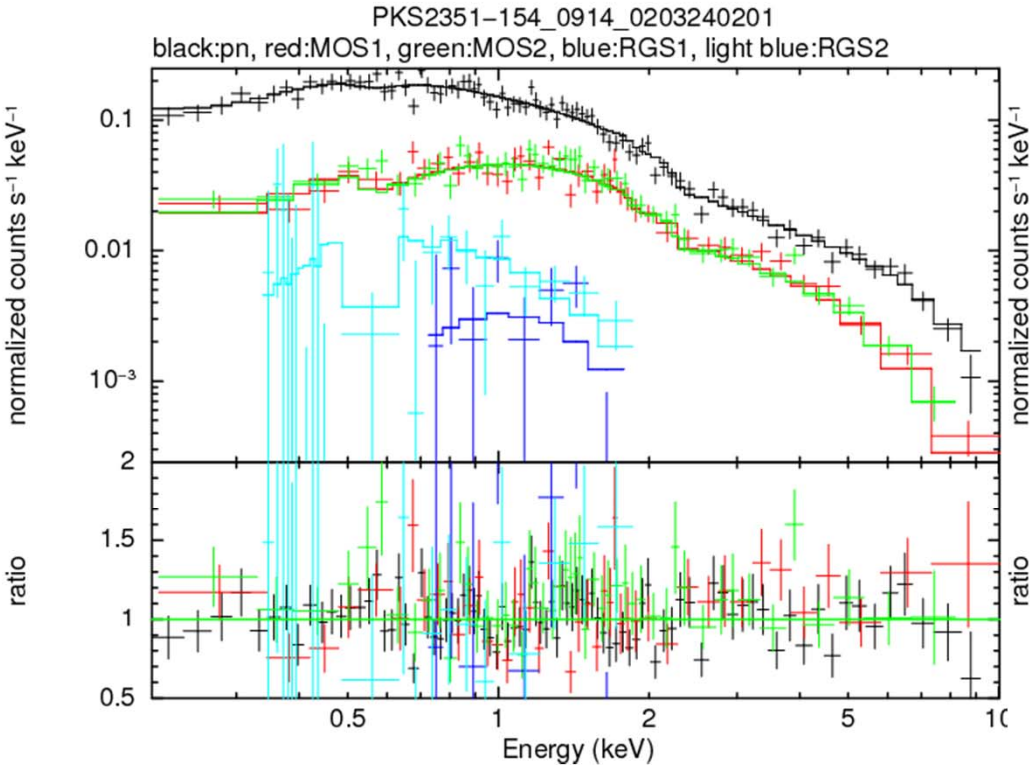
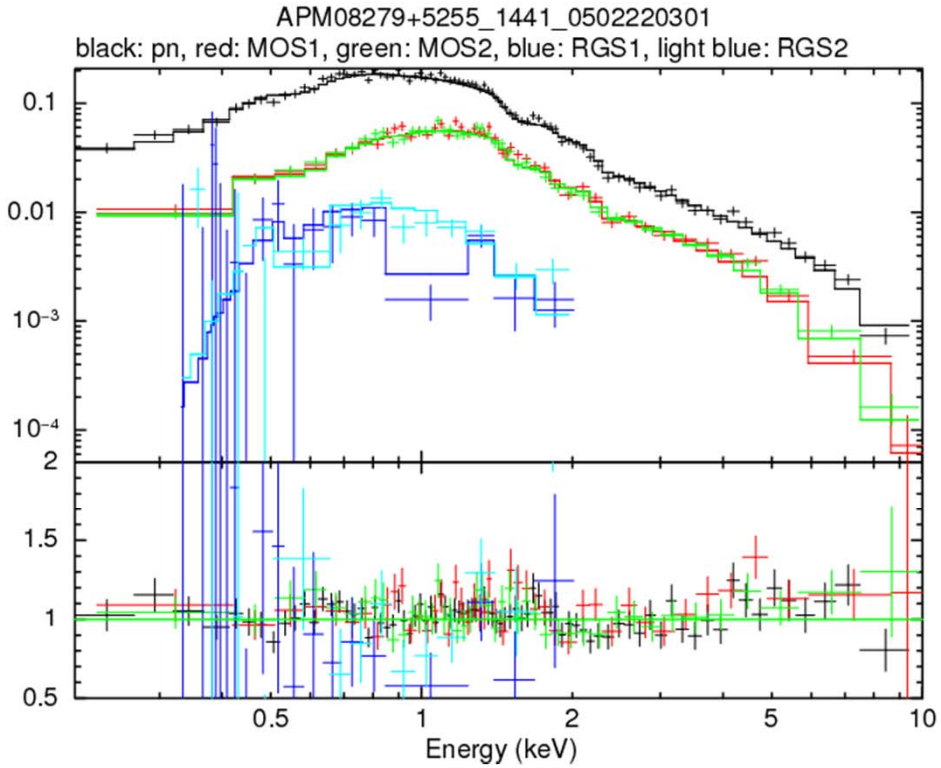
Status of XMM-Newton cross-calibration using SASv13.5

Martin Stuhlinger
EPIC BOC, MPE
26.03.2014

Examples: AGN

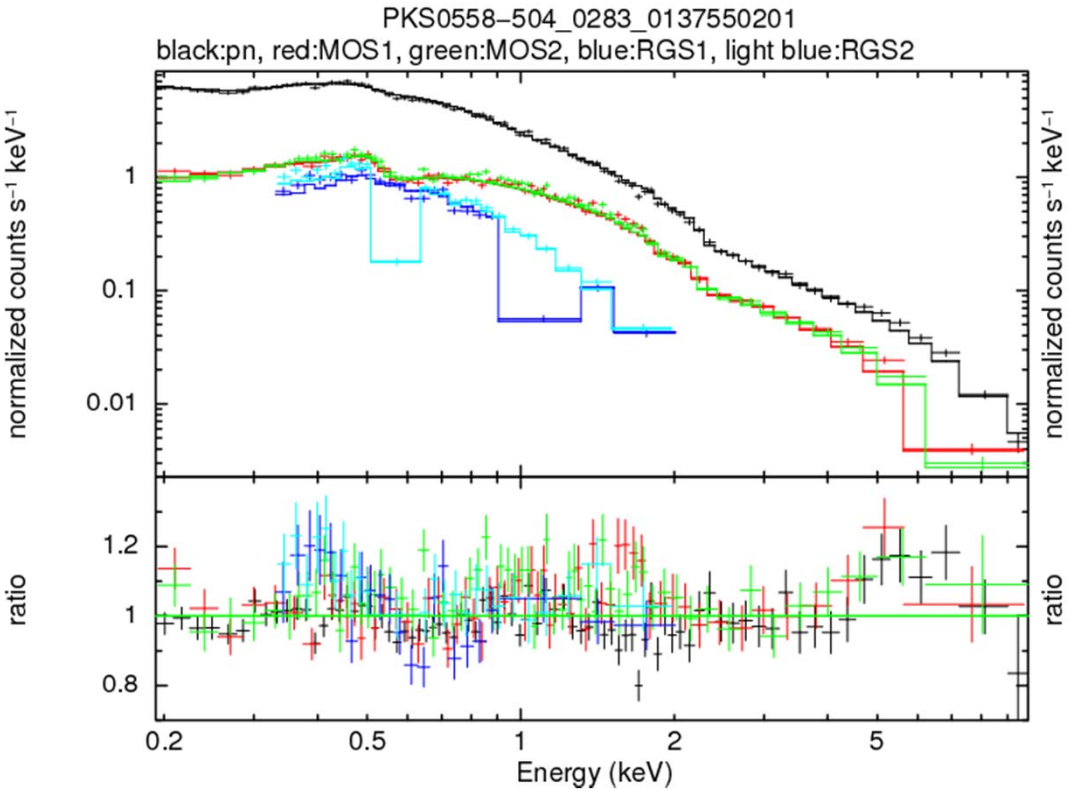
- All EPICs in FF mode without pile-up.

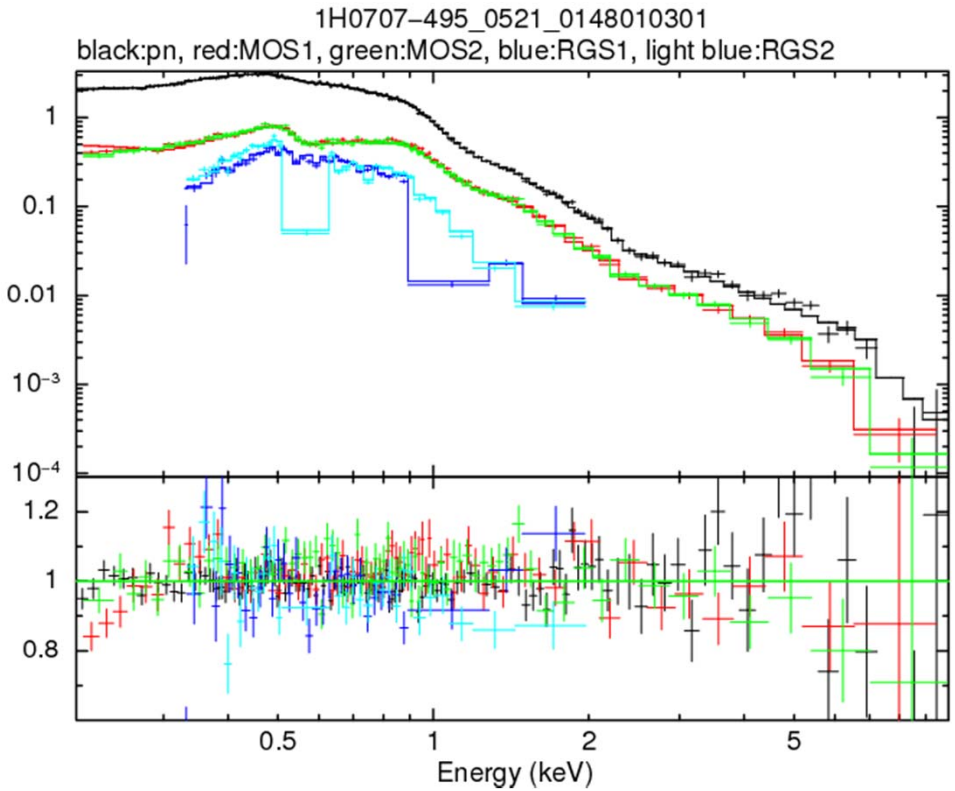




Examples: AGN

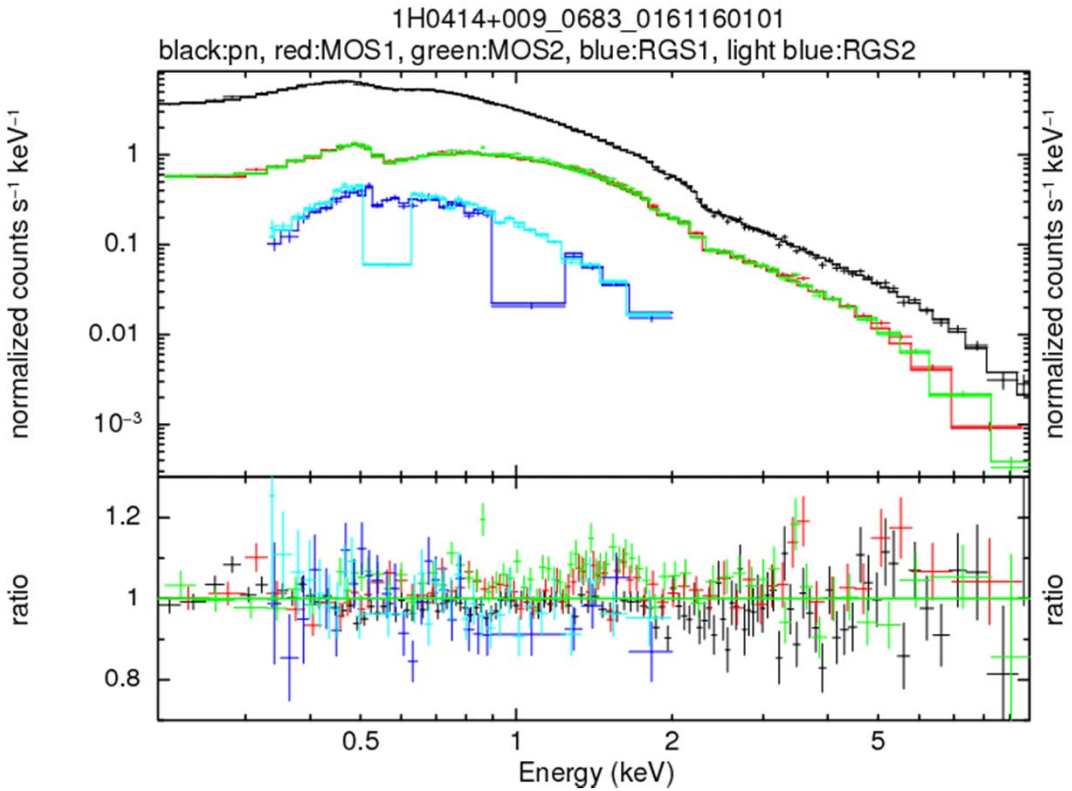
- All EPICs in FF mode with pile-up (10 arcsec).

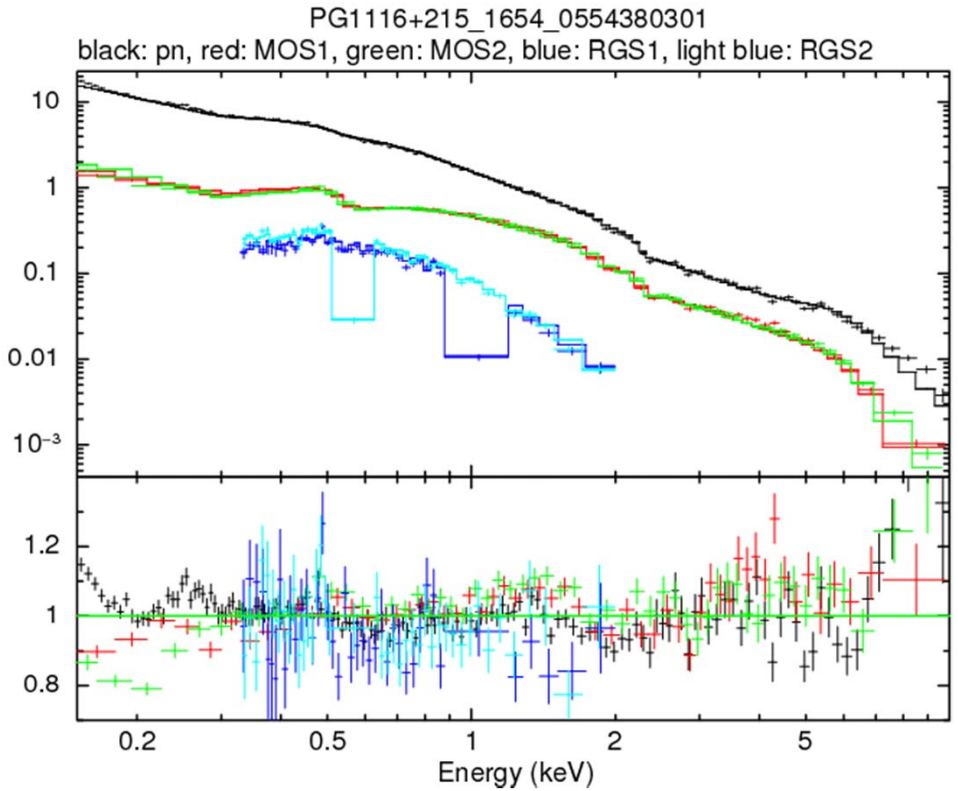




Examples: AGN

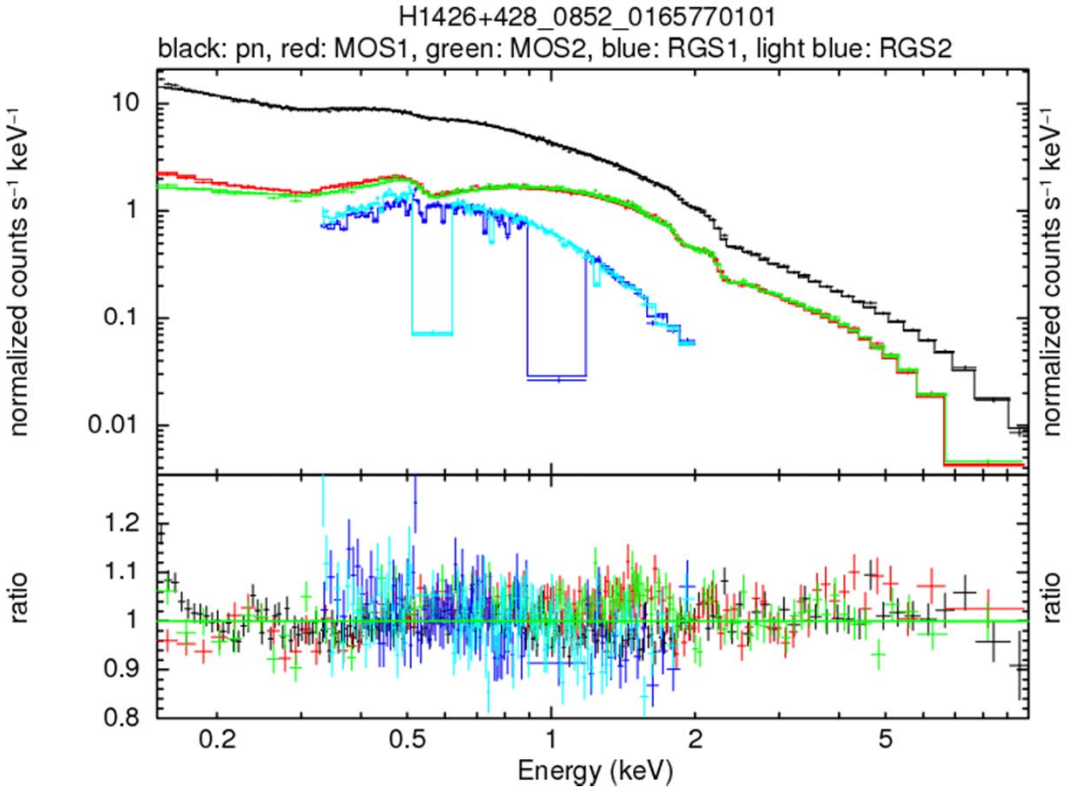
- All EPICs in SW mode without pile-up.

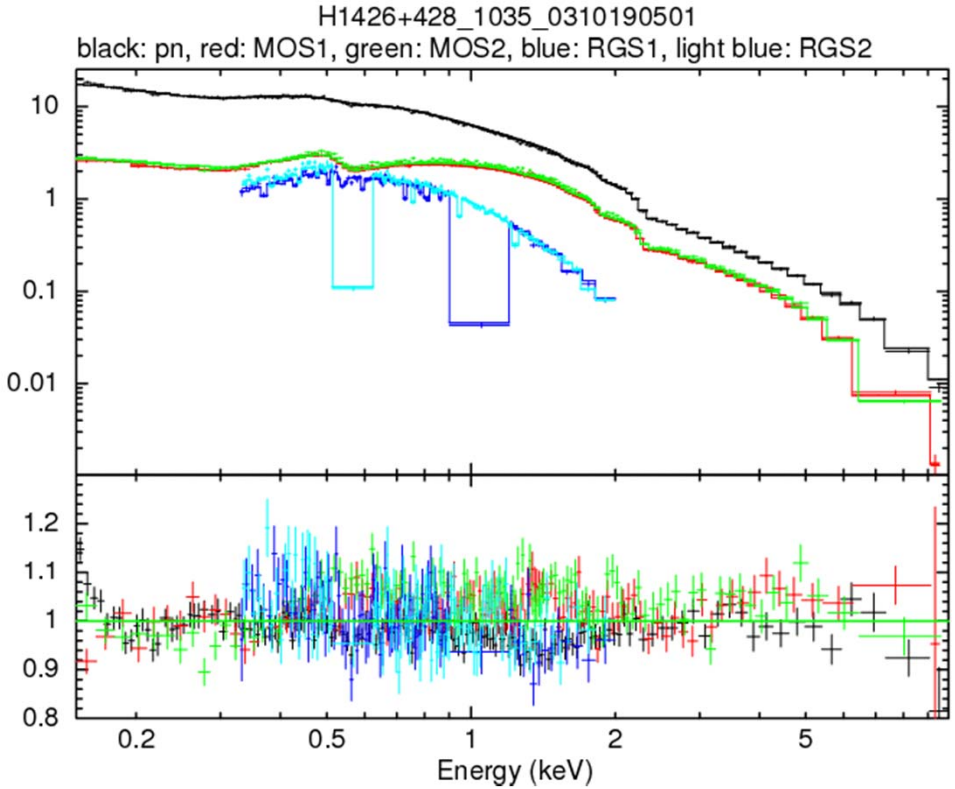




Examples: AGN

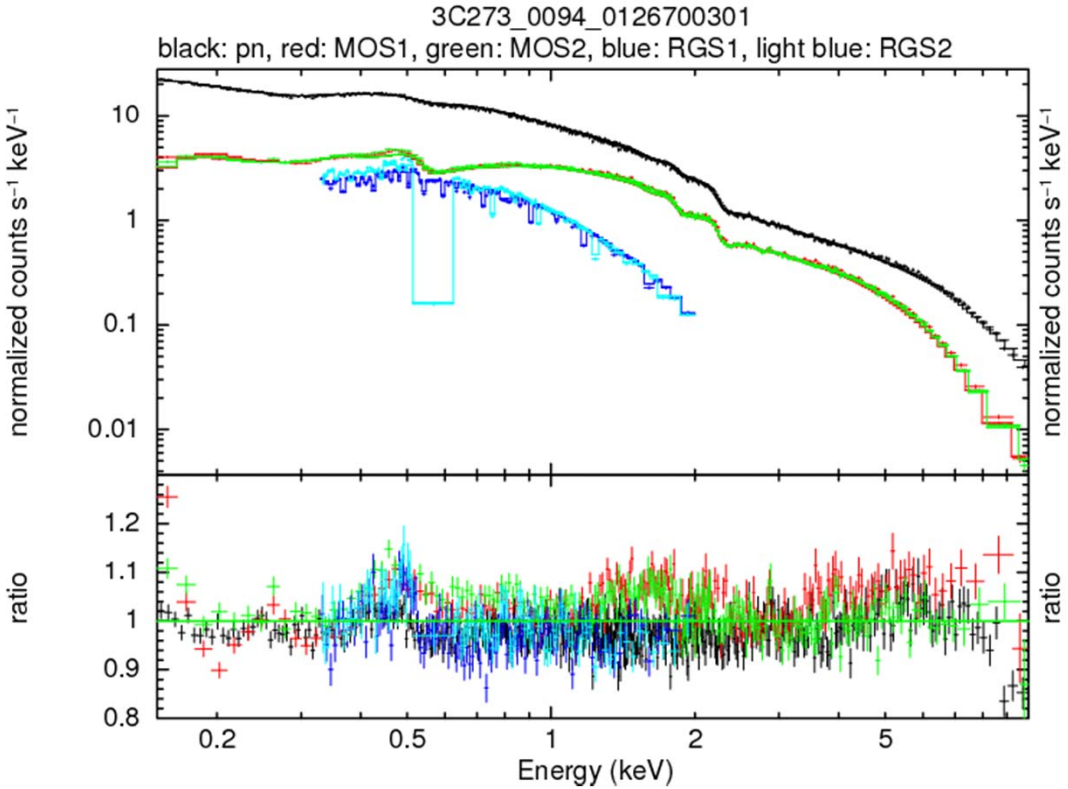
- All EPIC in SW mode with increasing pile-up: **H1426+428**, 3C273, PKS2155-304

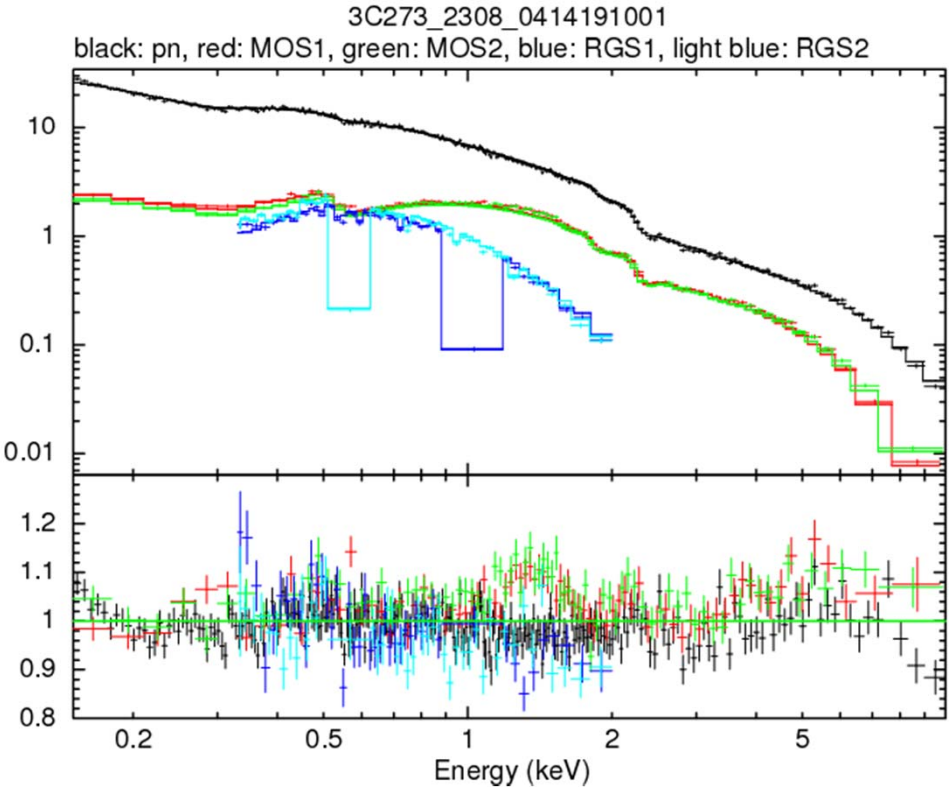




Examples: AGN

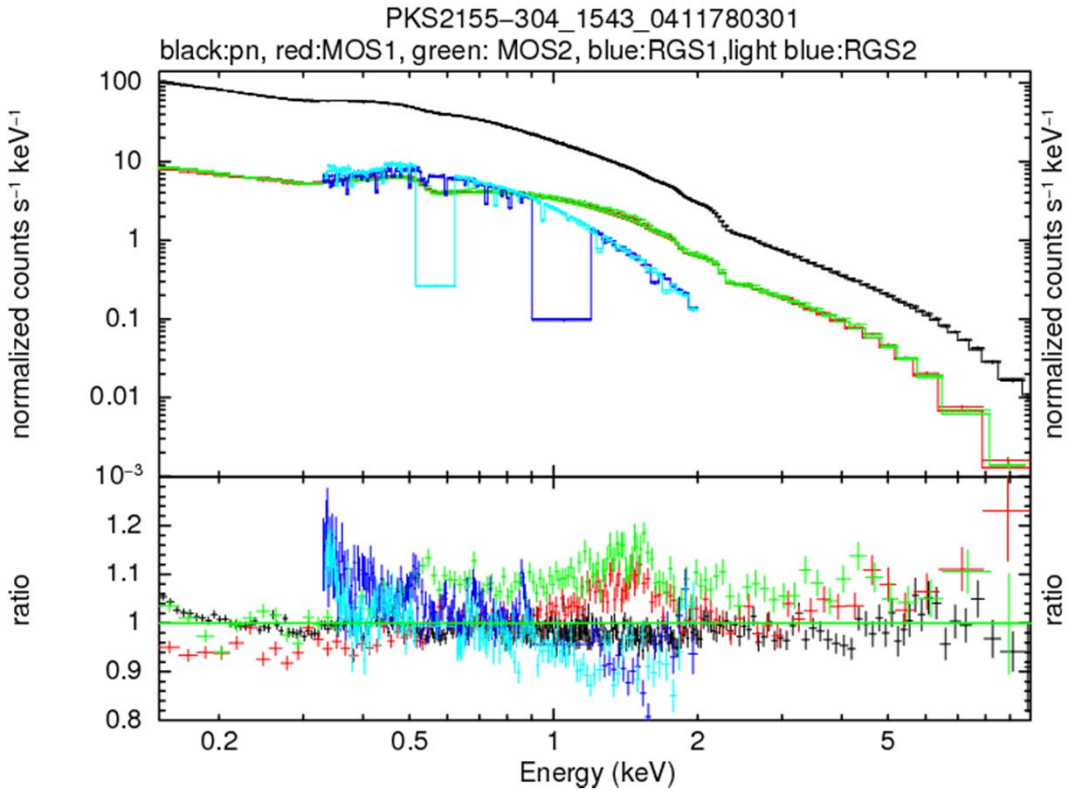
- All EPIC in SW mode with increasing pile-up: H1426+428, **3C273**, PKS2155-304

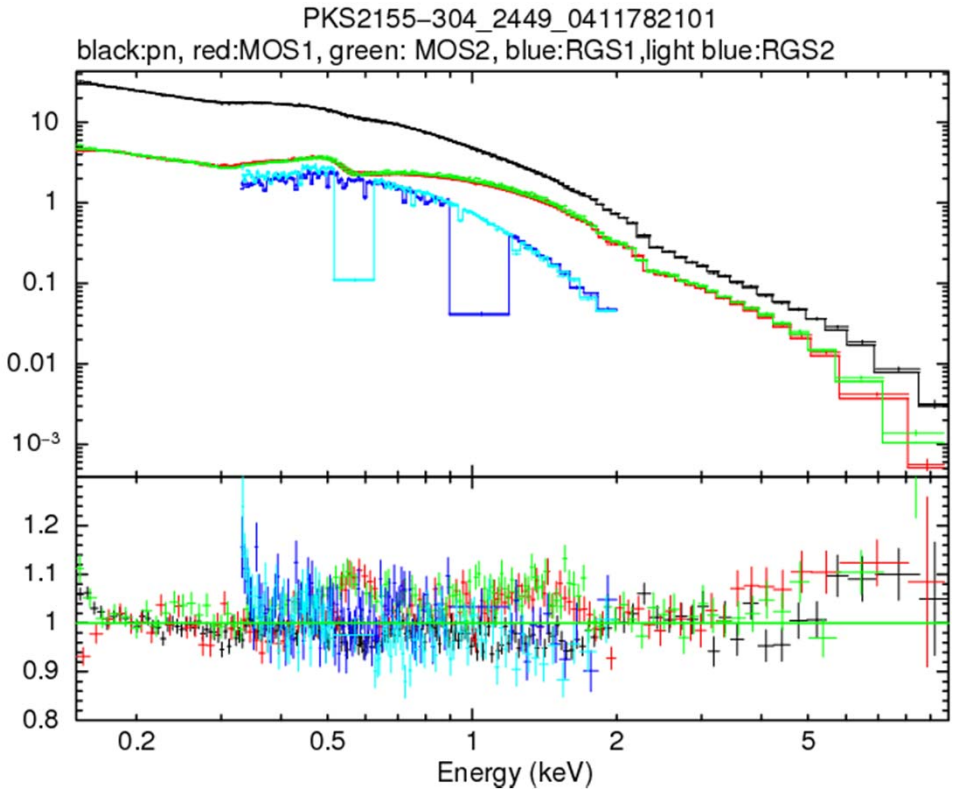




Examples: AGN

- All EPIC in SW mode with increasing pile-up: H1426+428, 3C273, **PKS2155-304**

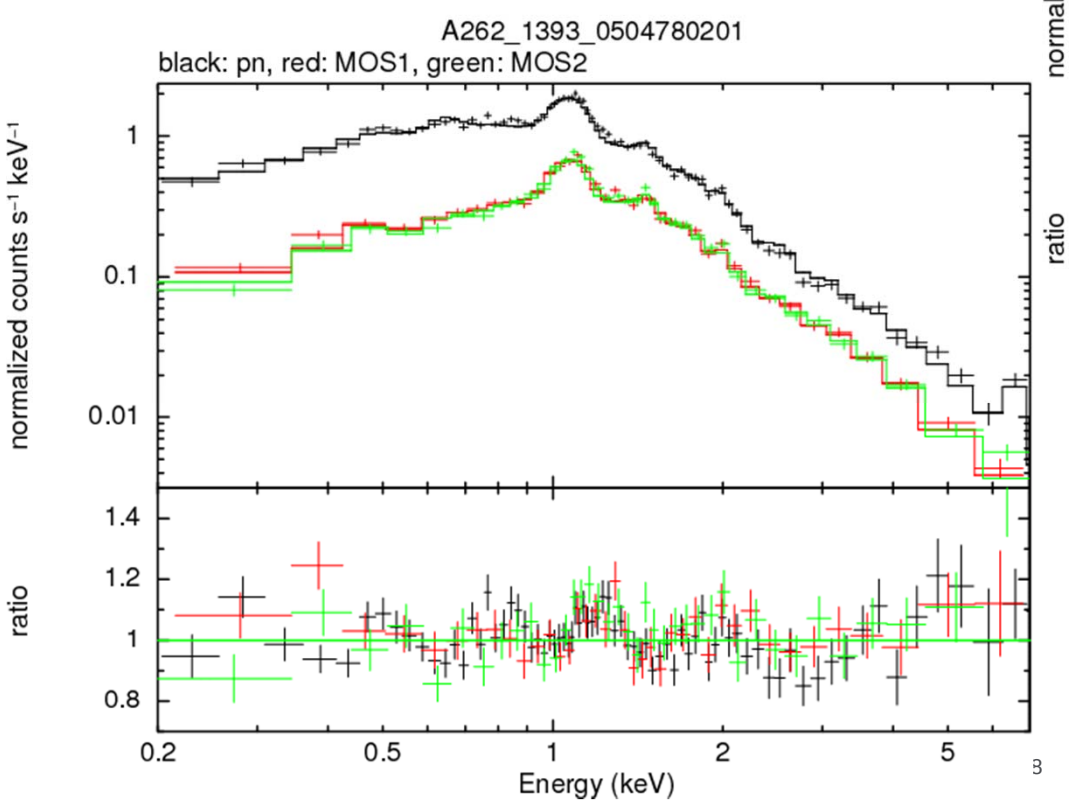


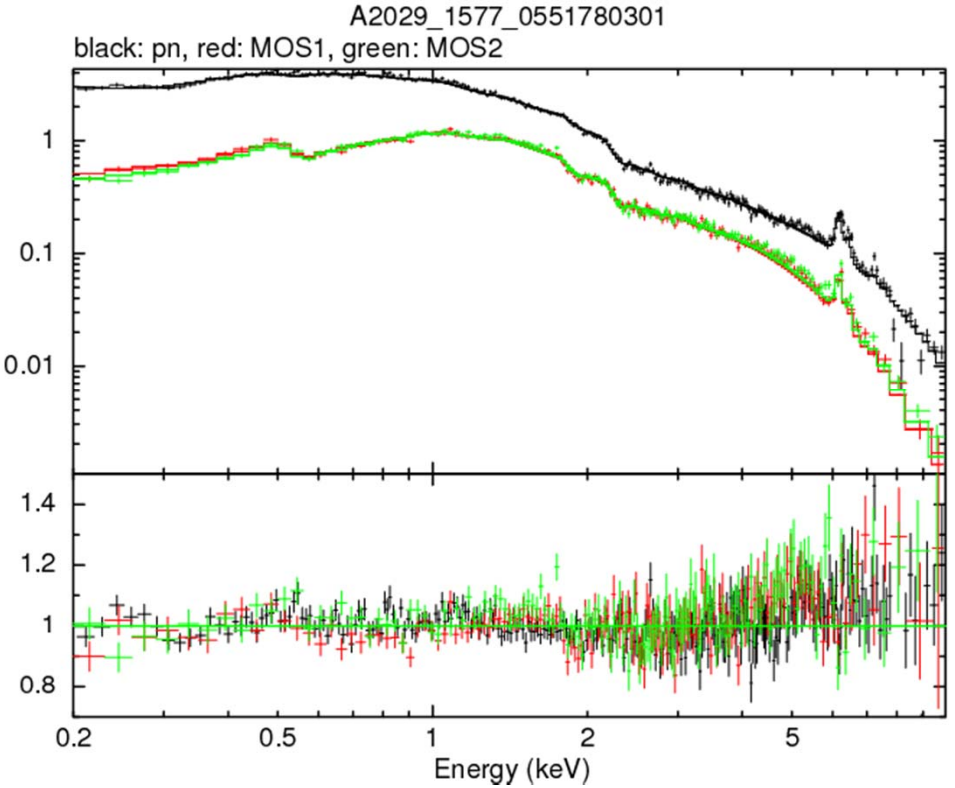


Examples: Galaxy clusters

- FF mode annuli. Single mekal model.

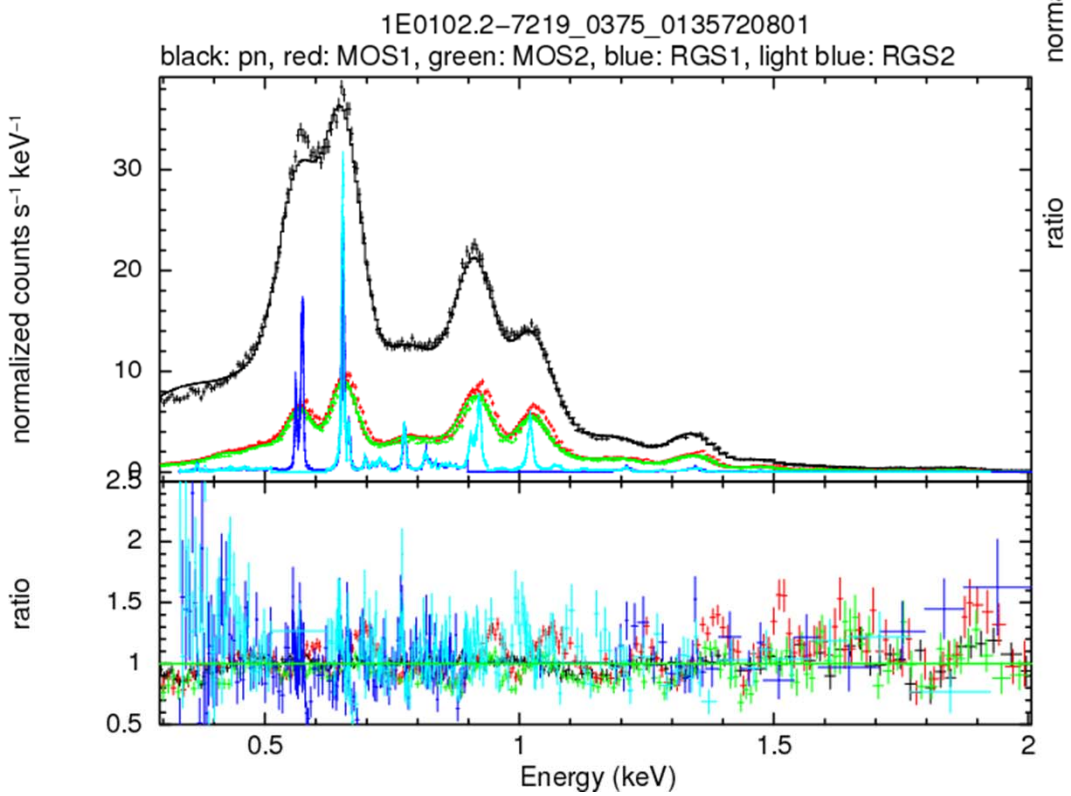
- A2029: kT ~ 7.1 keV
- A262: kT ~ 2.3 keV

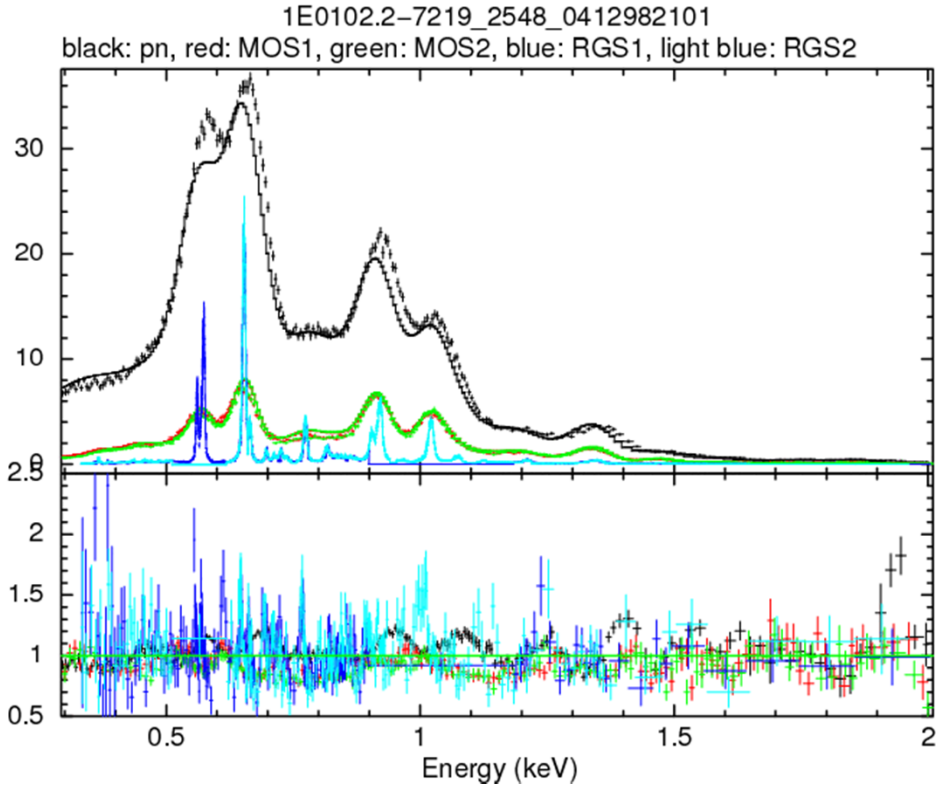




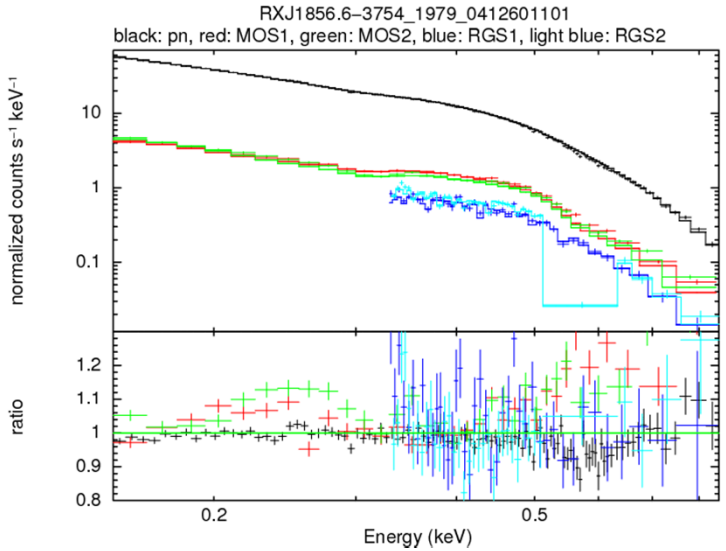
Example: SNR 1E0102.2-7219

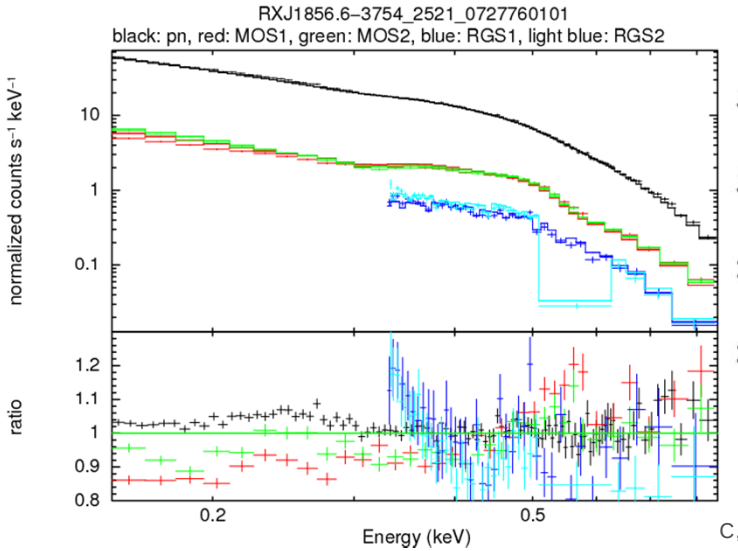
- IACHEC model: fixed line energies.

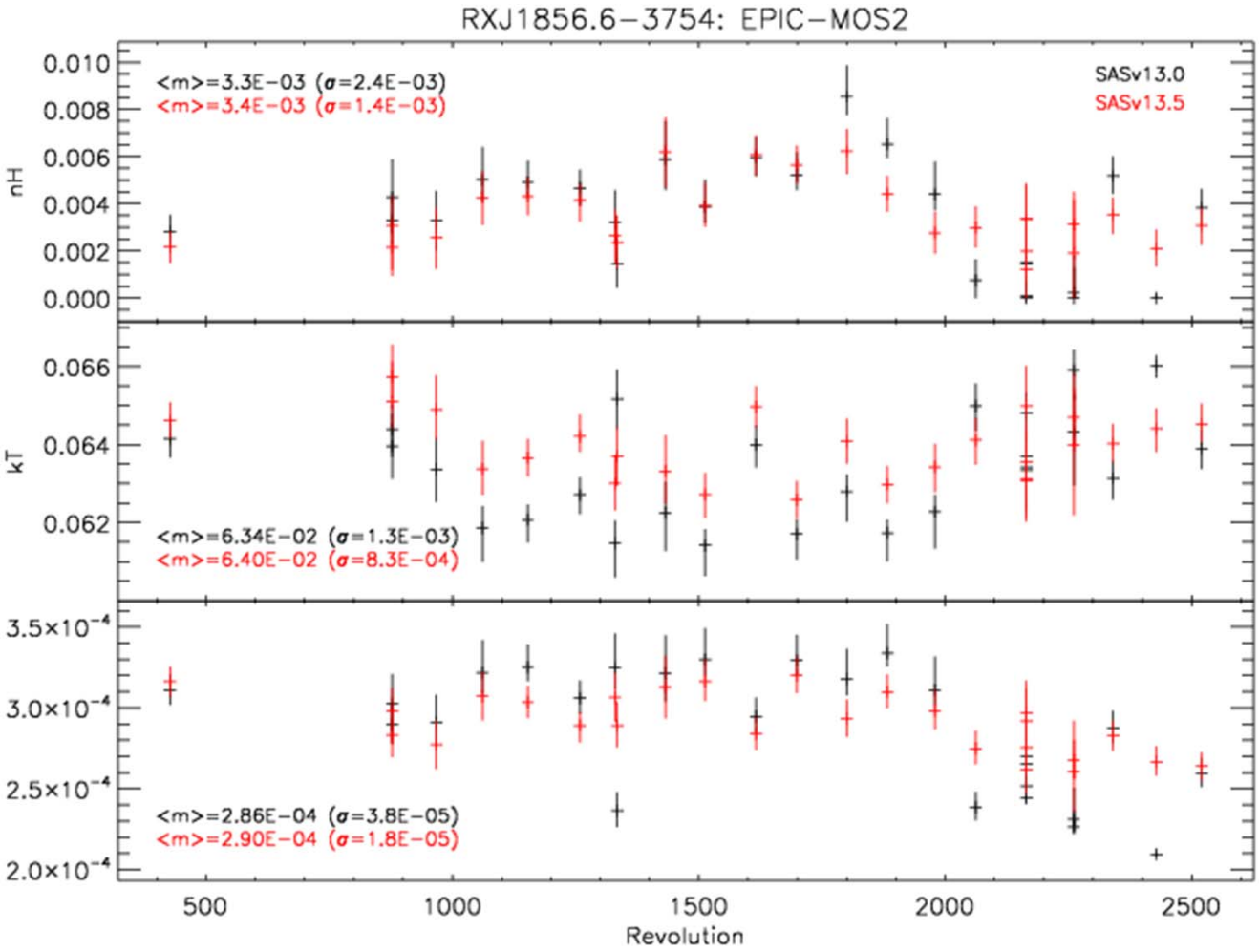




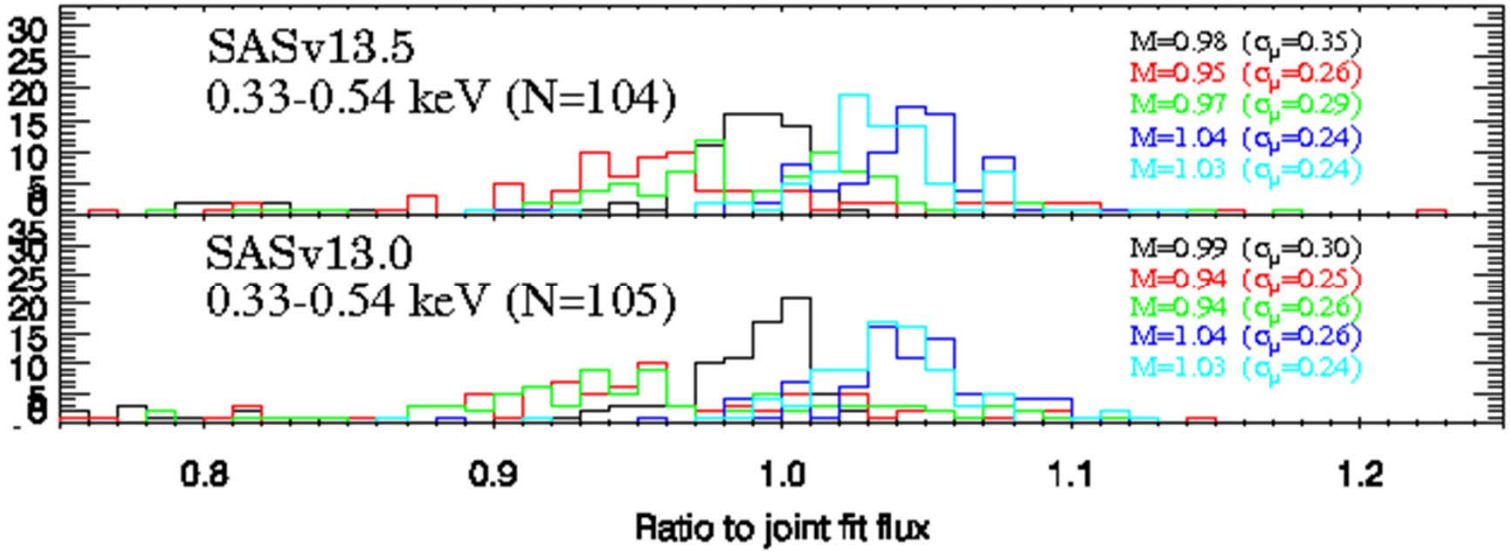
EPIC-MOS contamination model: RXJ1856







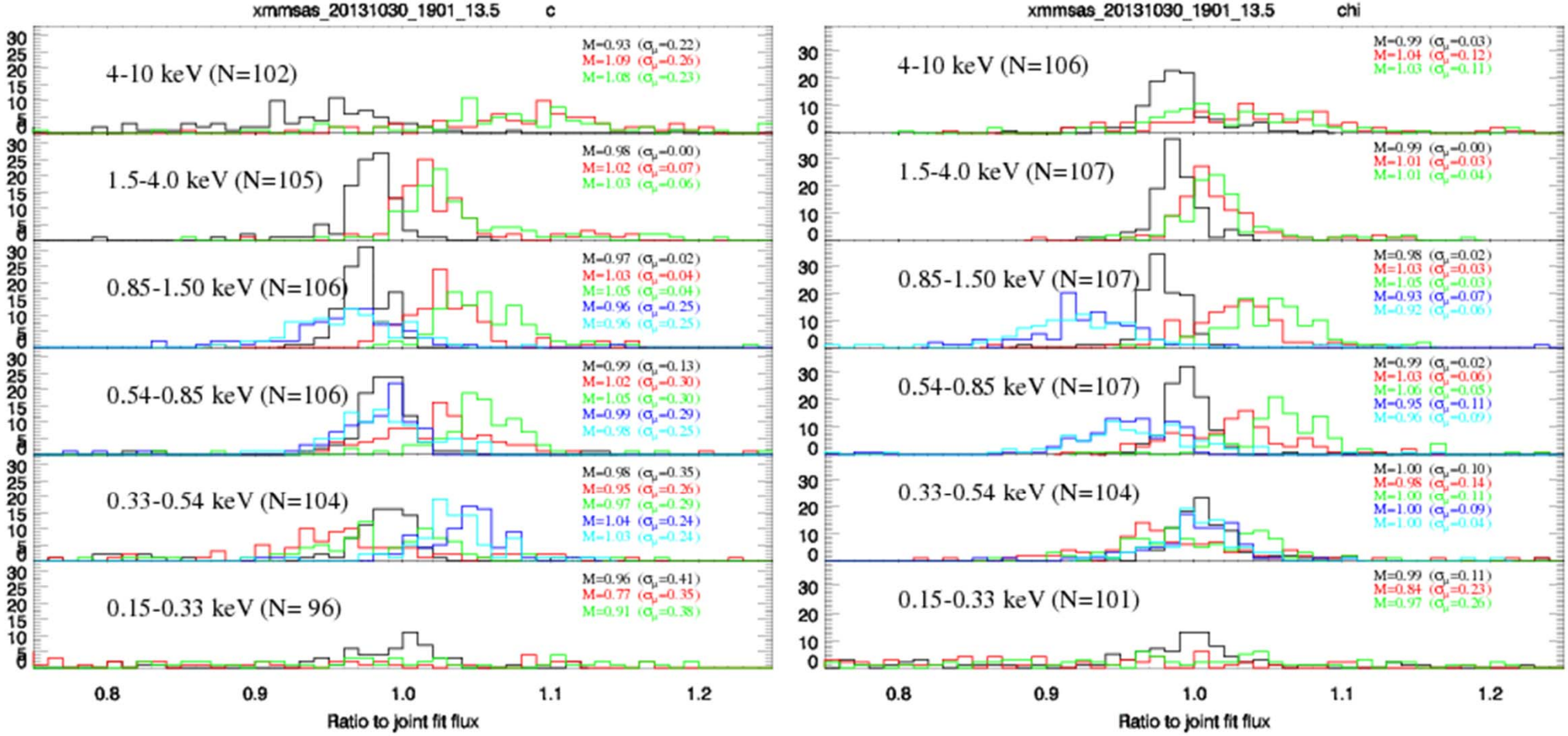
EPIC-MOS contamination model: XCAL AGN



- Low energy flux distributions of EPIC-pn and EPIC-MOS2 more consistent, MOS2 distribution more extended.
- EPIC-MOS1 fluxes closer as well, still few percent below the other two EPICs.

Flux distributions

- Again XSPEC statistics: C-stat (un-binned) versus chi^2-statistic (min 25 binned)



Summary

- EPIC-MOS contamination model improved consistence between all instruments at low energies. Current level might need a revisal.
- EPIC-MOS return about 5-7% higher fluxes compared to EPIC-pn at all energies above 0.5 keV, less at Si/Au-edge band.
- EPIC-pn show line shifts to higher energies in most recent observations (effect of long term CTI model).

Discussion opened again:

- Selection of XSPEC statistics changes the cross-calibration interpretation between EPIC and RGS:
  - C-statistics (background treatment): agreement of RGS and EPIC-pn above ~0.5 keV, below RGS returns higher fluxes.
  - Chi^2-statistics (weighting bias): agreement of RGS and EPIC below ~0.5 keV, above RGS returns lower fluxes.
- C-statistics indicate too large spread (~15%) between EPIC-pn and EPIC-MOS. We don't find this in the data/model ratios.