

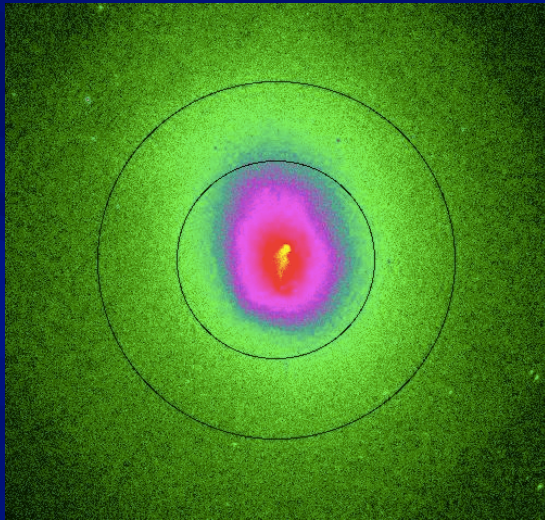
Chandra Calibration Status



IACHEC Meeting May 12, 2014

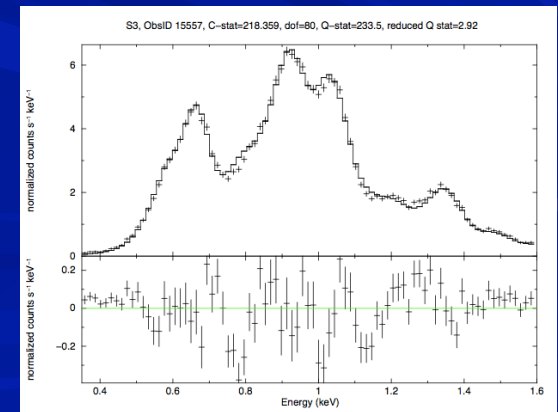
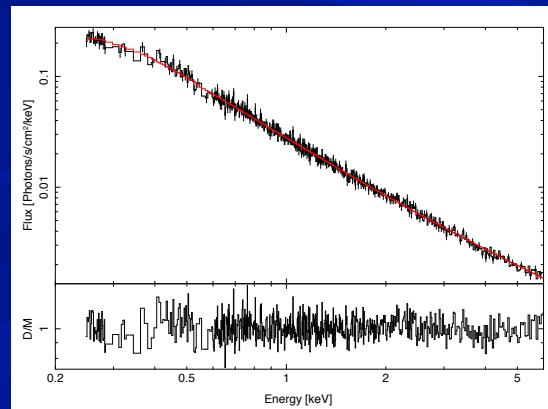
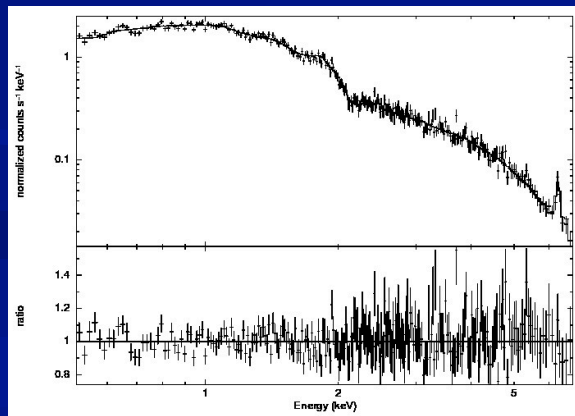
Contamination on the ACIS Filters

Abell 1795



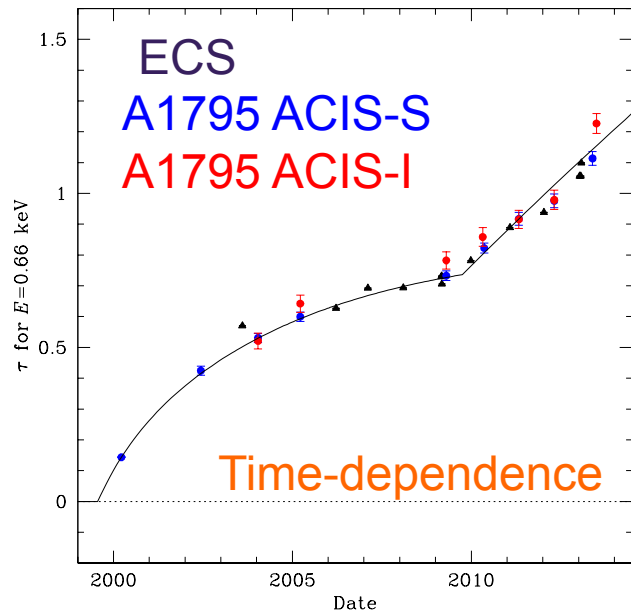
Blazars

Mkn 421
PKS 2111-304

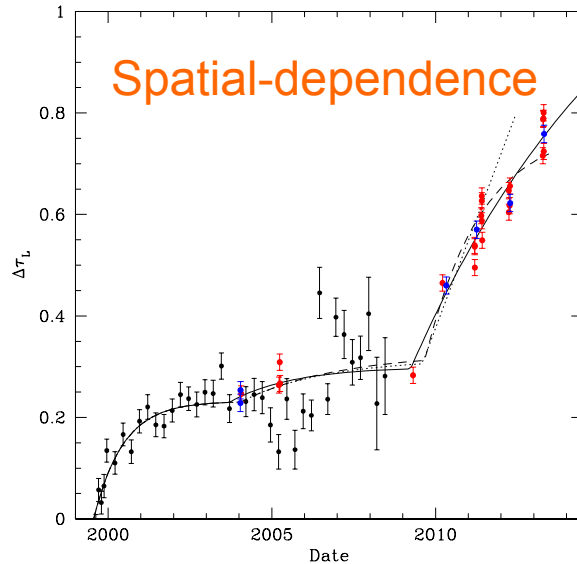
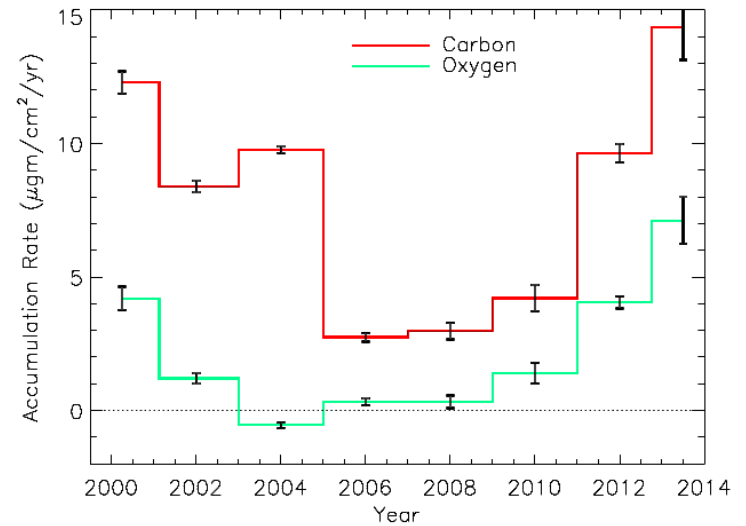


Contamination on the ACIS filters

Plots are based on data acquired through 2013.



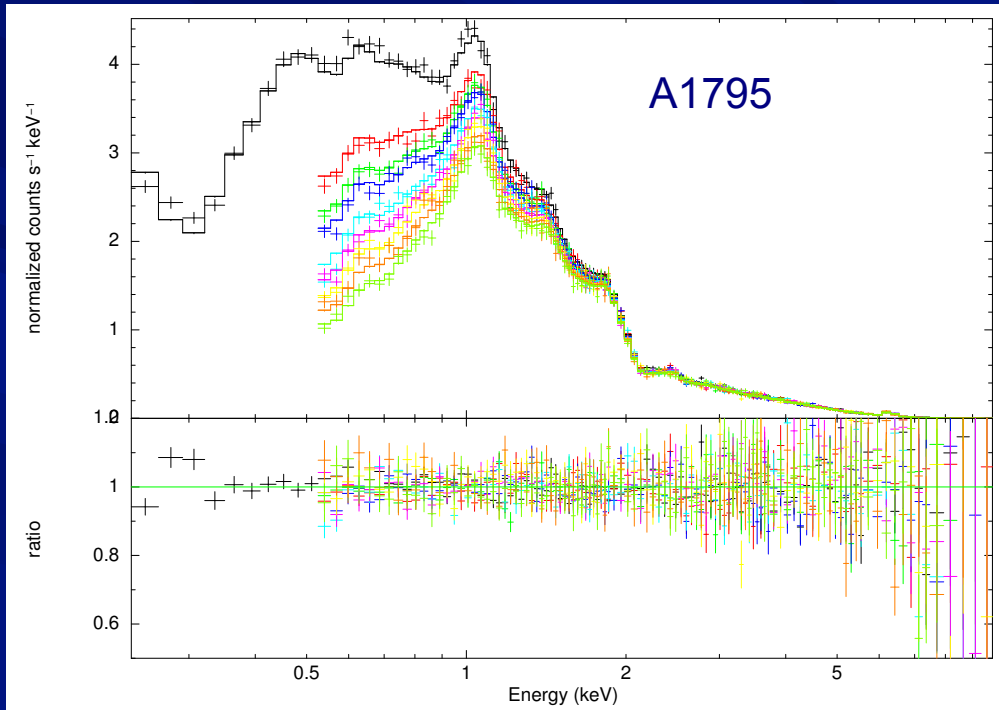
From LETG/ACIS-S data



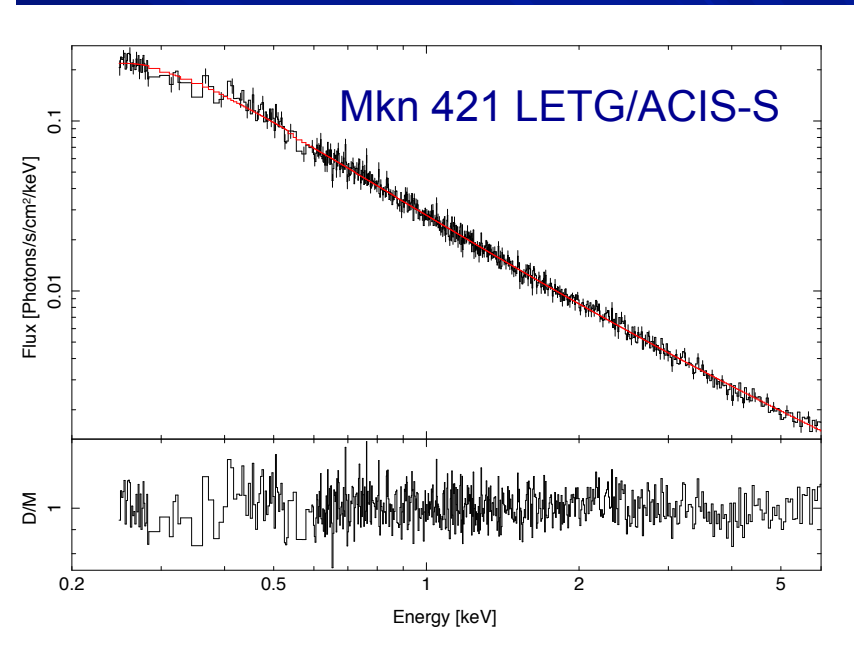
Composition

Contamination on the ACIS filters

Spectral fits with ACIS contamination model V7



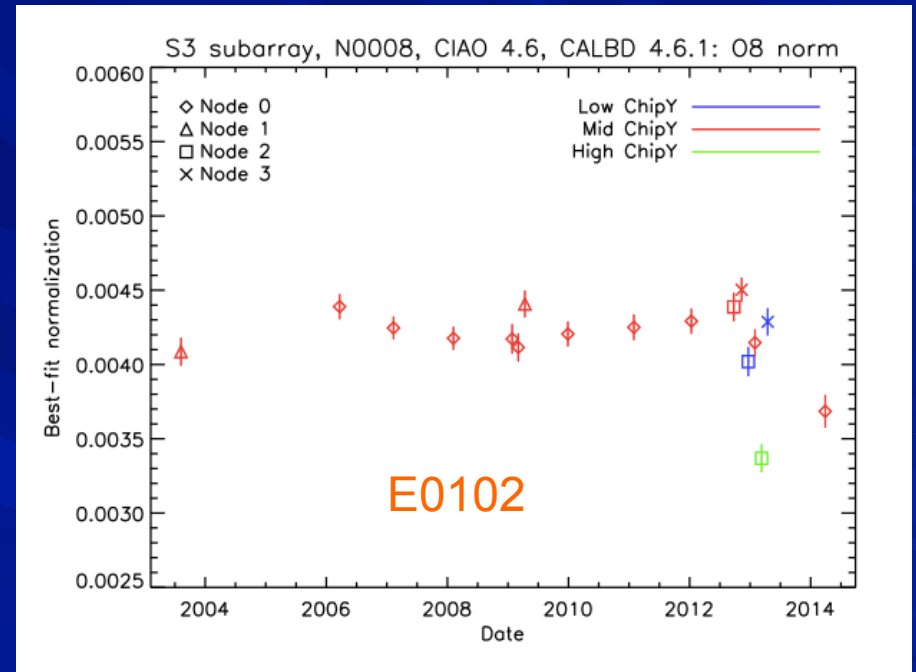
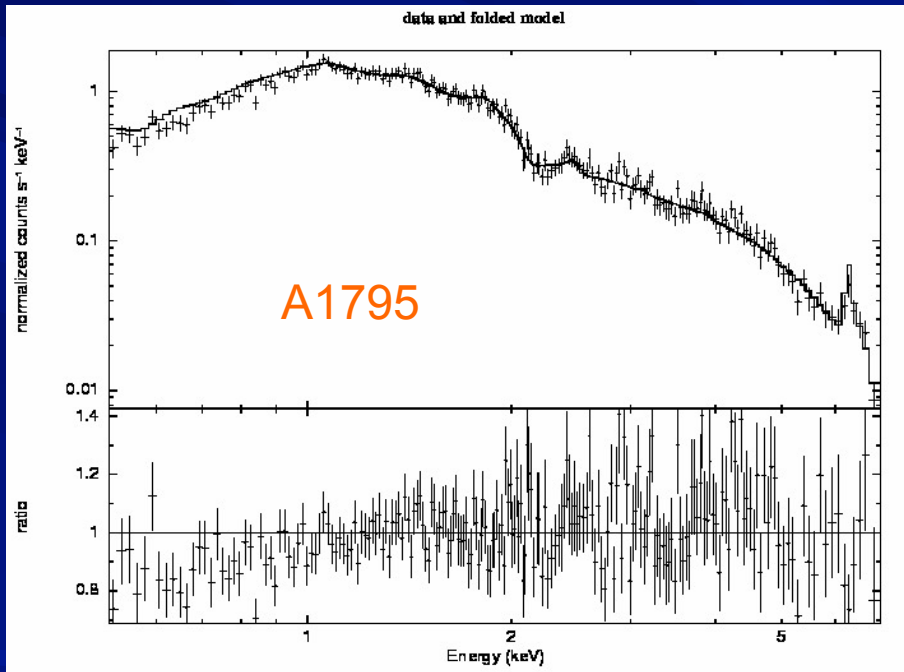
Data are from 2013



ACIS contamination model V7 is a pure C, O and F edge model. No additional absorption features are included.

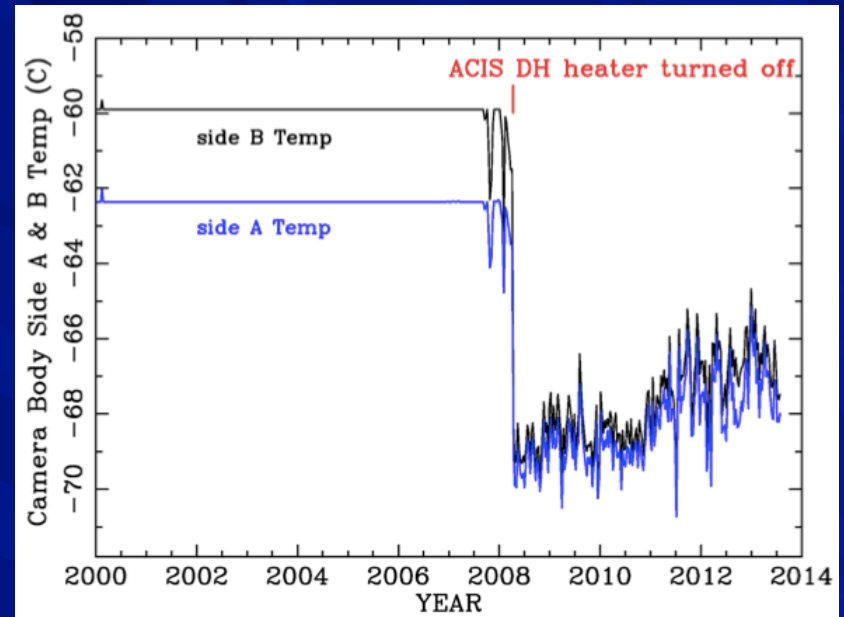
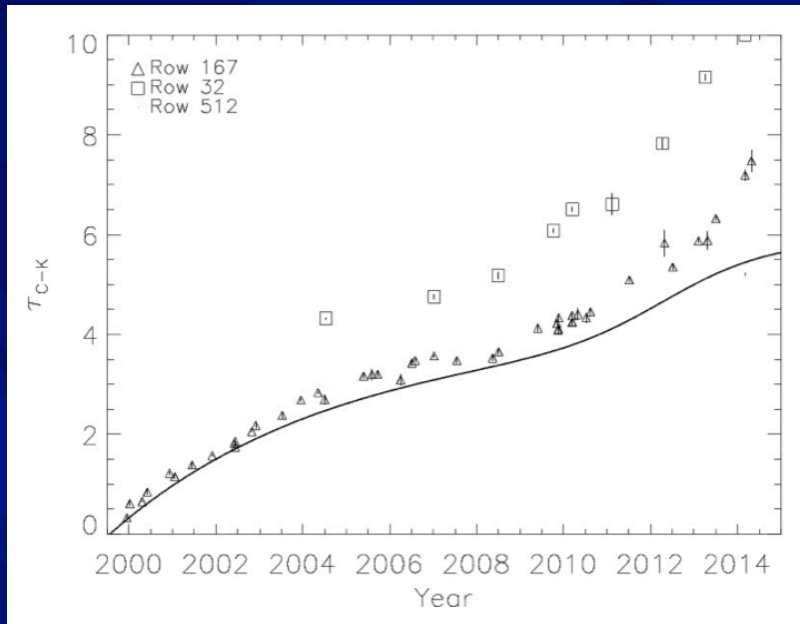
Contamination on the ACIS filters

April 2014 observations fit with ACIS contamination model V7

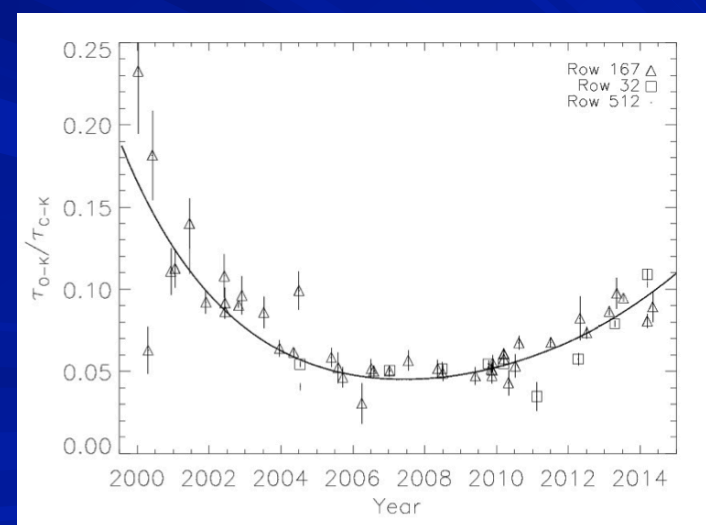
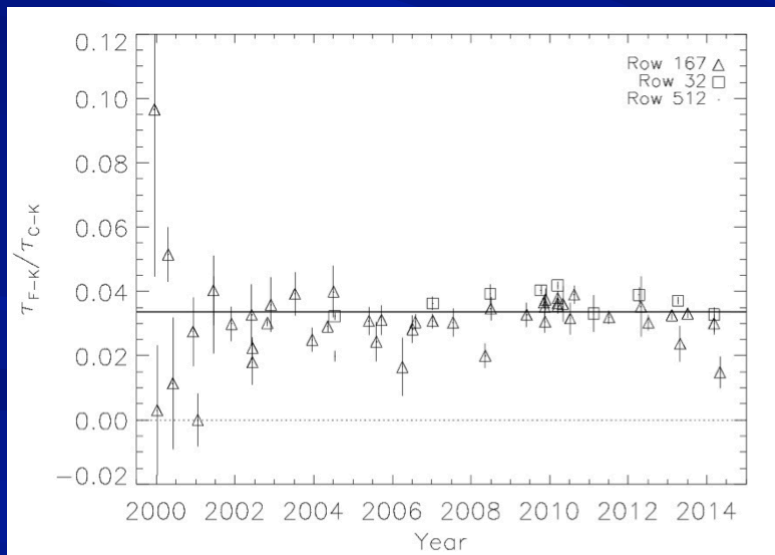


Contamination on the ACIS Filters

Mkn421 LETG/ACIS-S big dither observations (March 2014)



There are also indications of different spatial gradients for C and O and absorption from N in the gratings data.

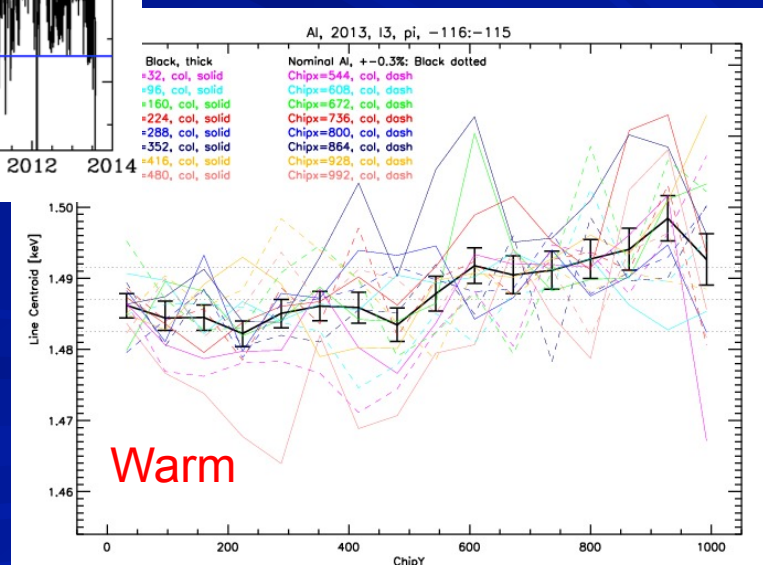
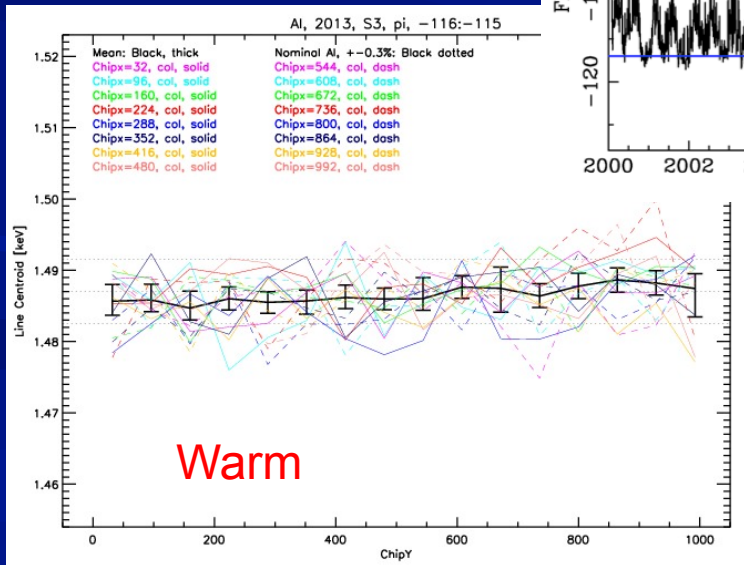
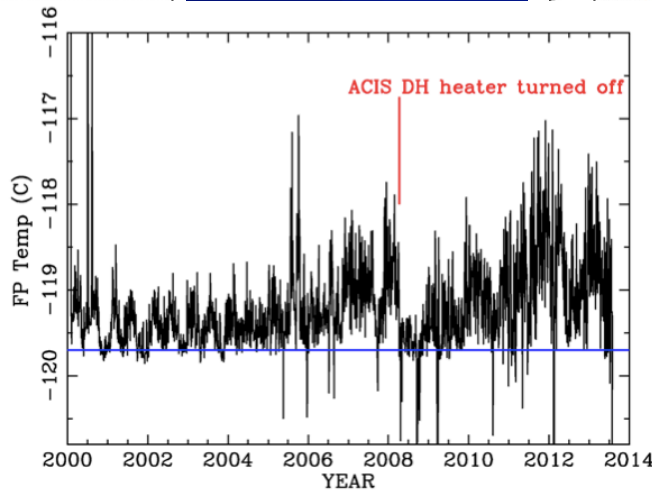
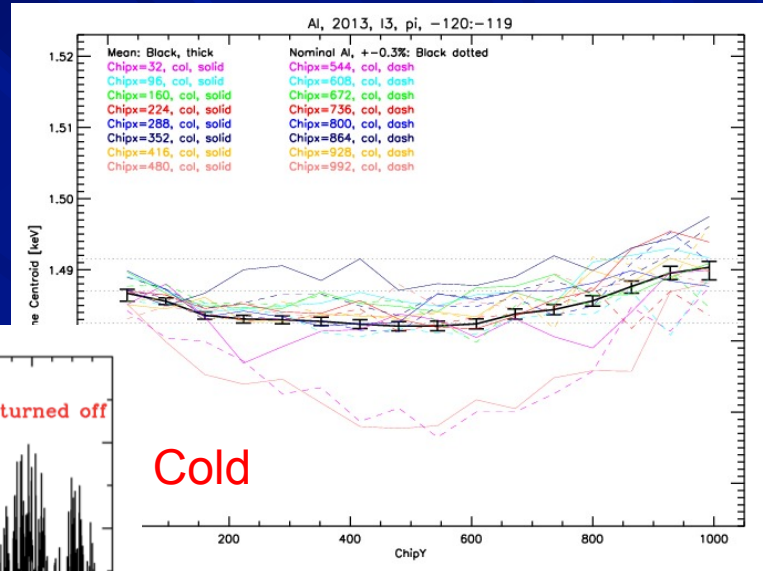
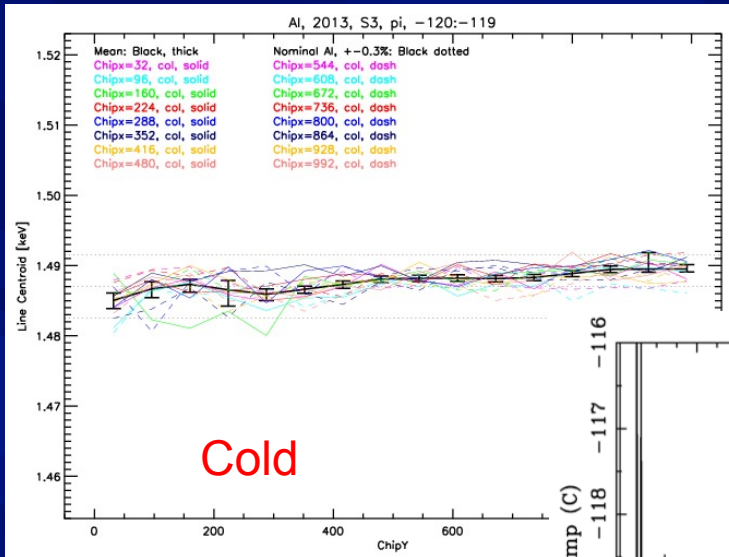


ACIS Temperature-Dependent CTI Correction

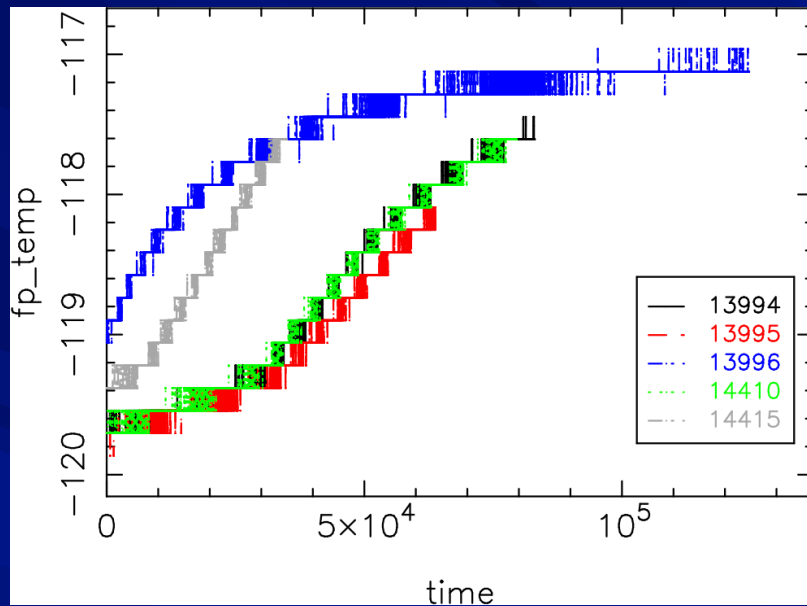
ACIS-S3

ECS AI-K α

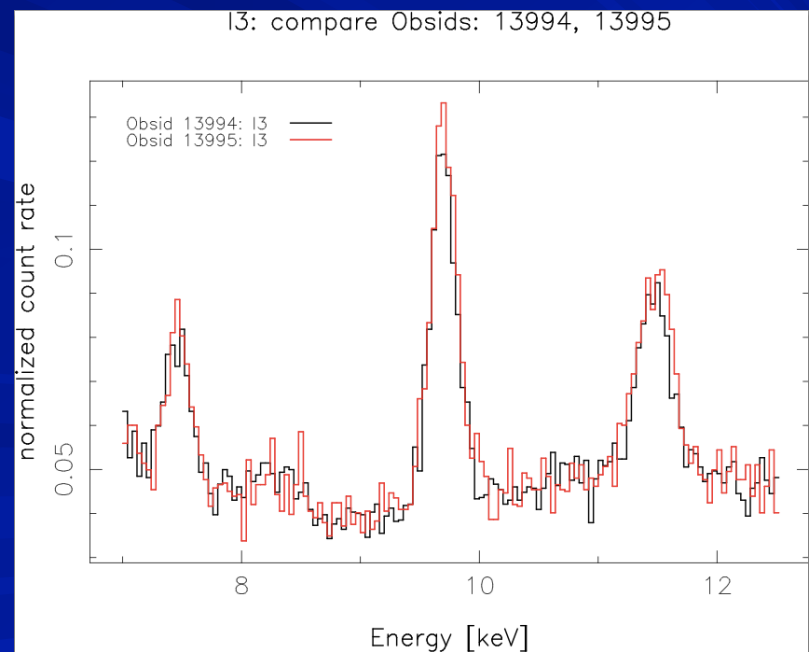
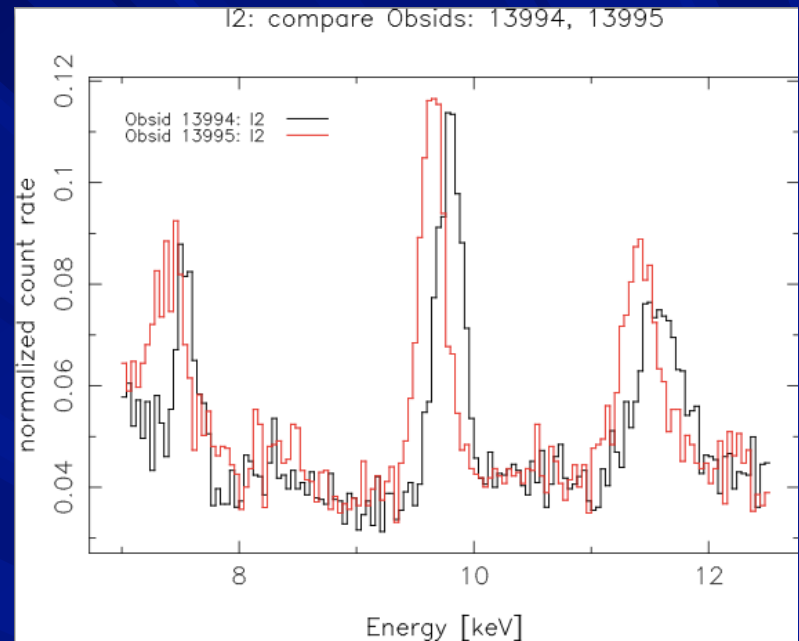
ACIS-I3



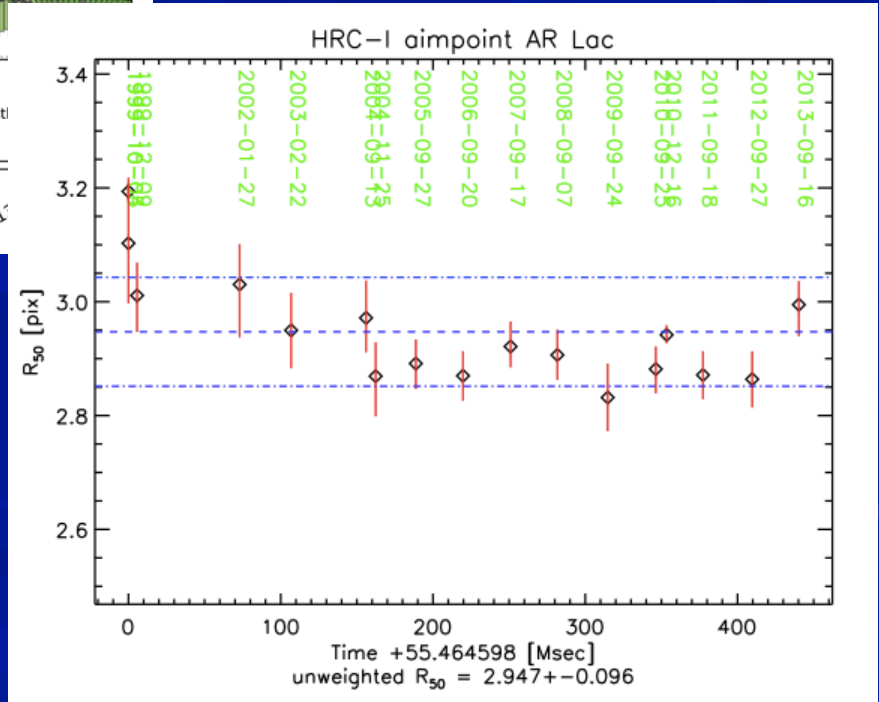
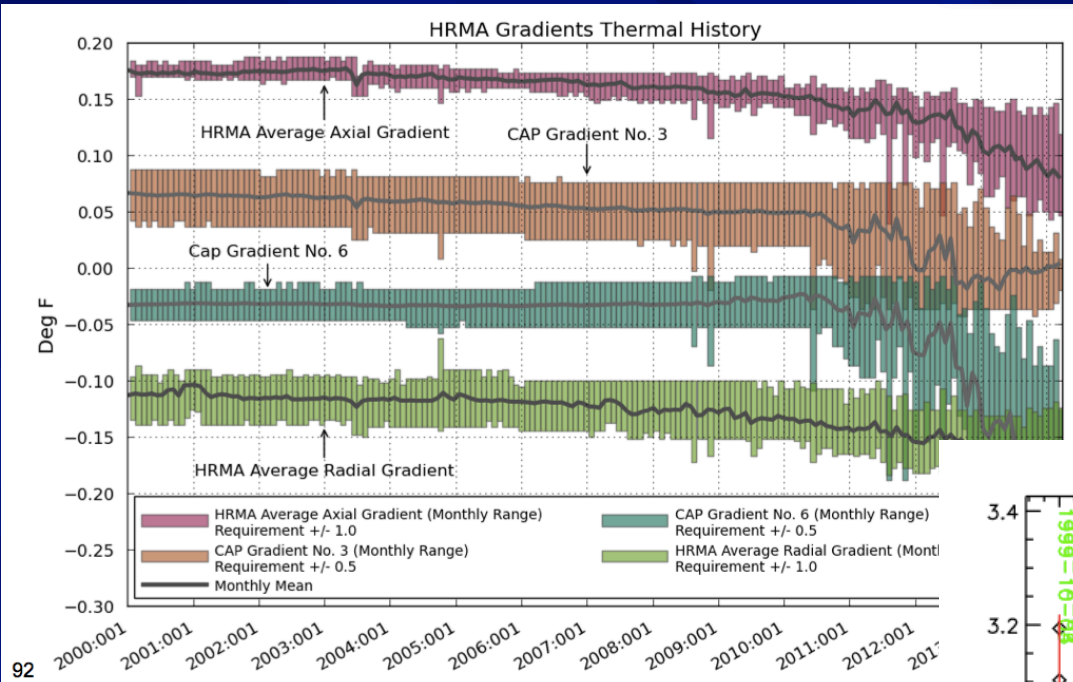
ACIS Temperature-Dependent CTI Correction



There are short term gain variations on I0 and I2 that require self-calibration.



HRMA Thermal Gradients

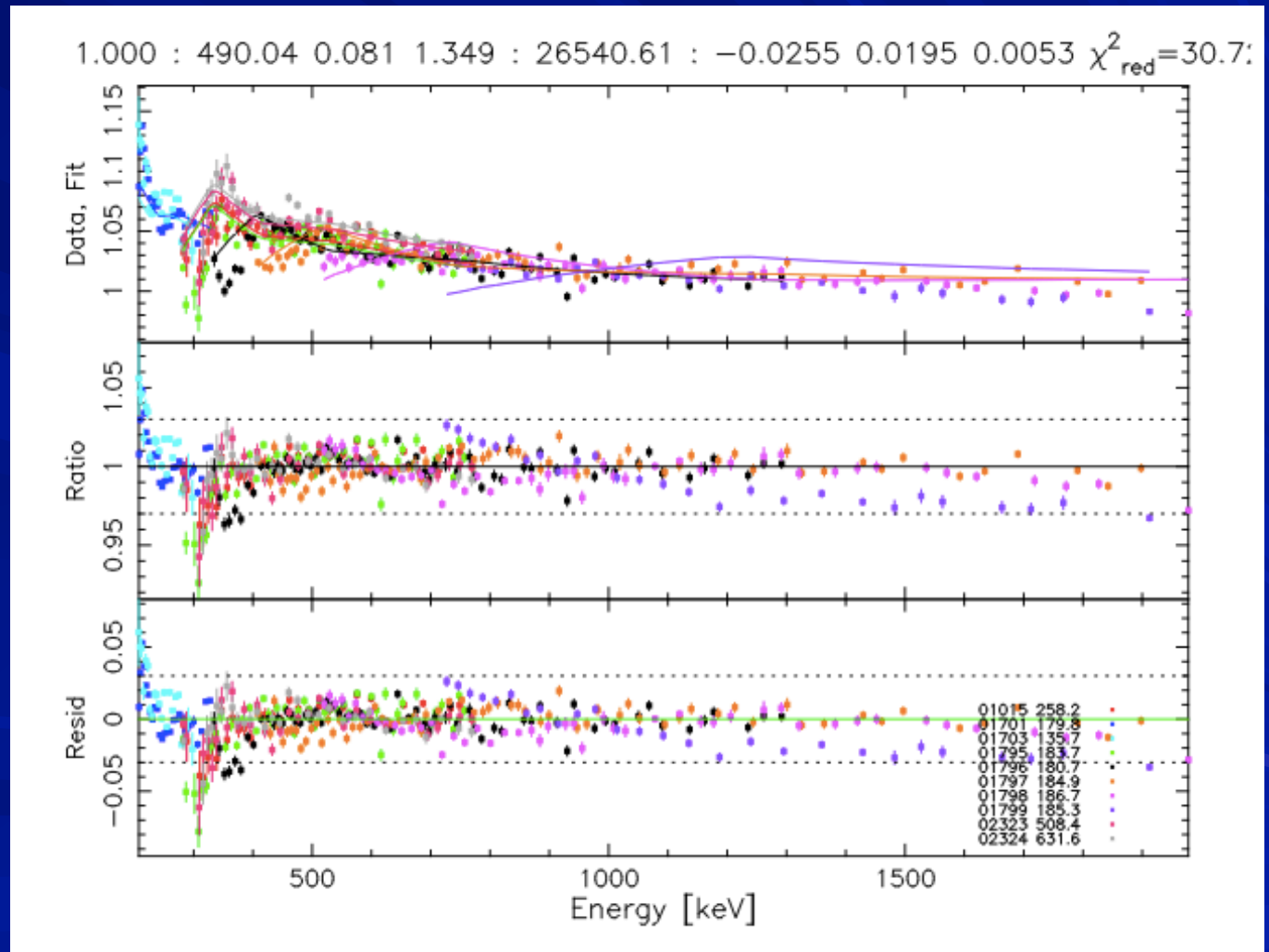


Thermal gradients across the HRMA in the top-to-bottom direction will affect the PSF in imaging data and the LSF in gratings data.

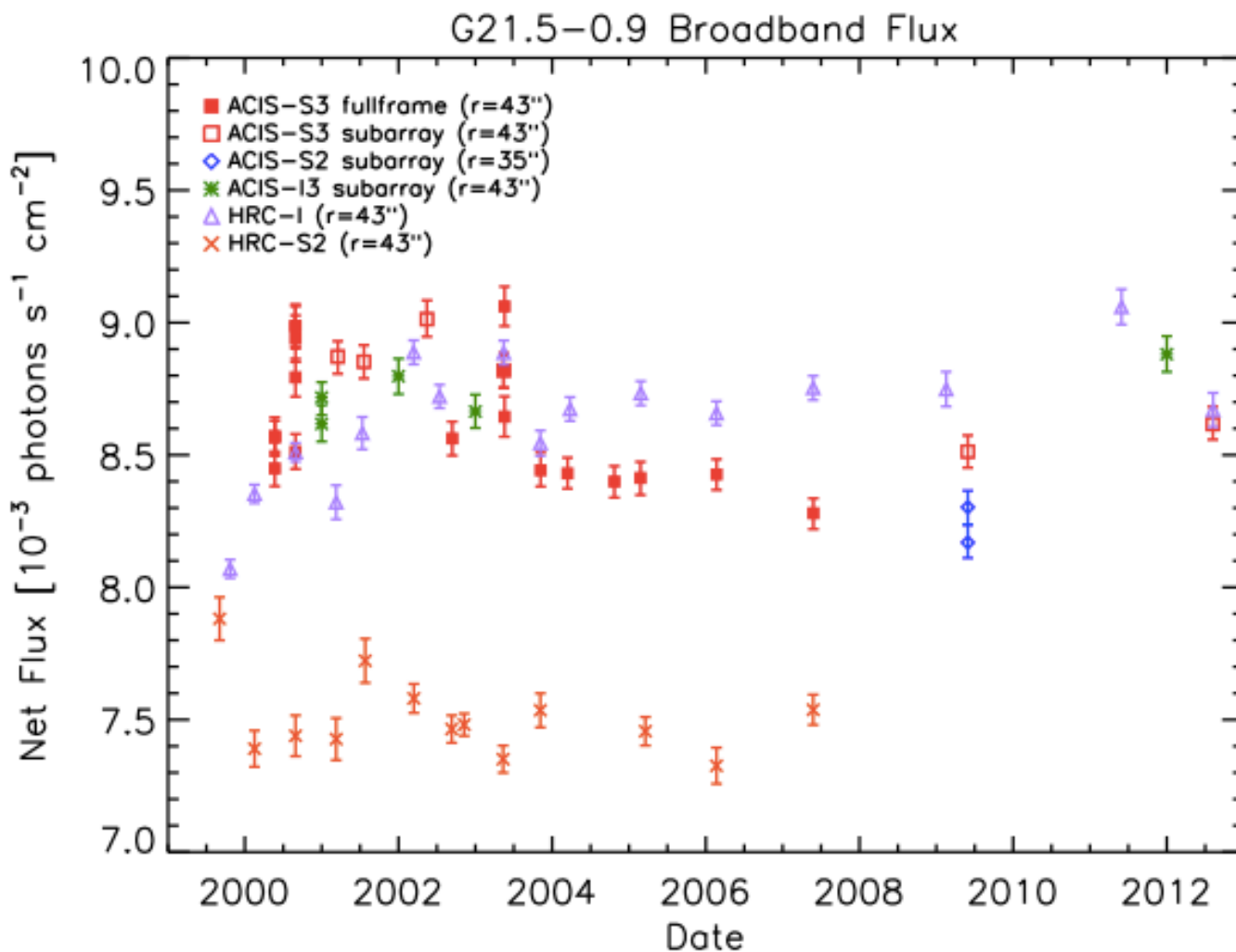
ACIS Low energy Gain

Plots are based on a set of LETG/ACIS-S observations taken at different off-sets along the dispersion axis.

Ratio of photon energy derived from detector gain to that derived from the dispersion relation

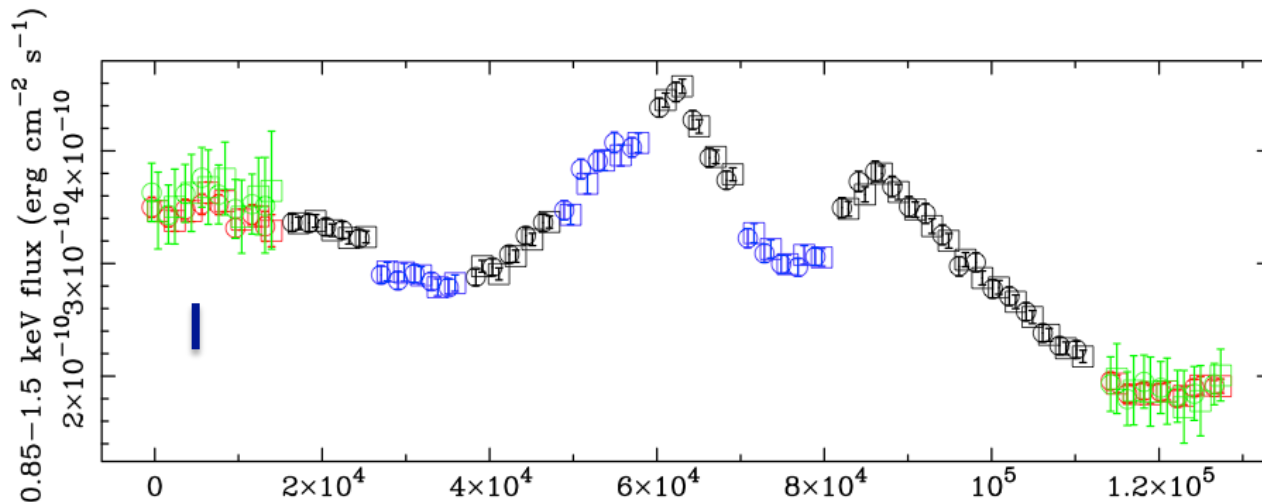


Chandra Internal Cross-Calibration with G21.5-09



Mkn 421 Interleaved 0.85-1.5 keV

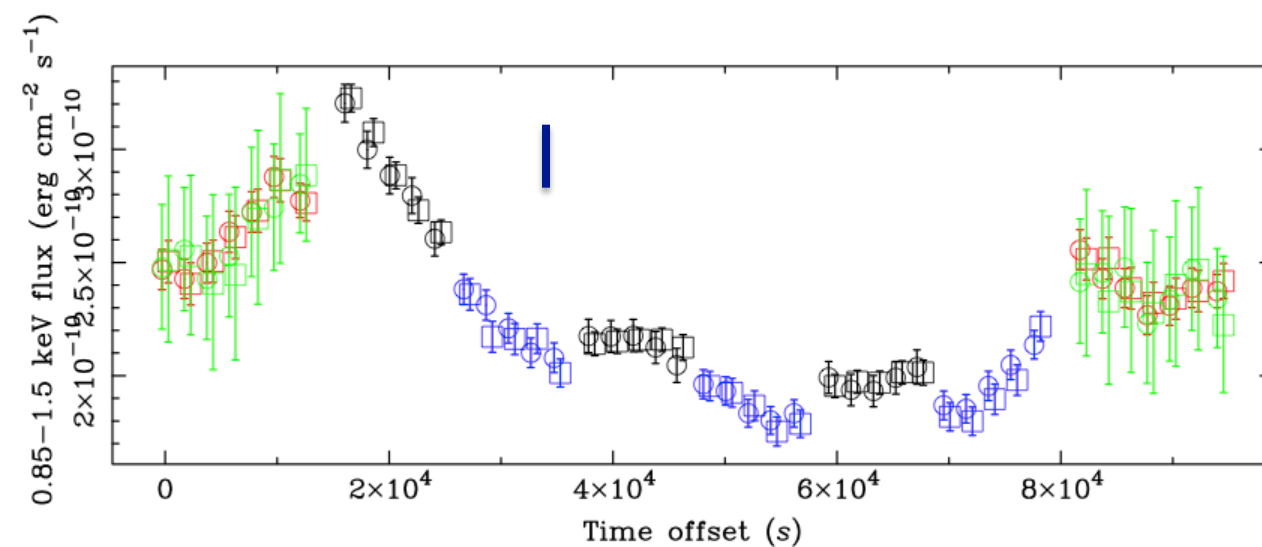
13-03-10



□ +
○ -

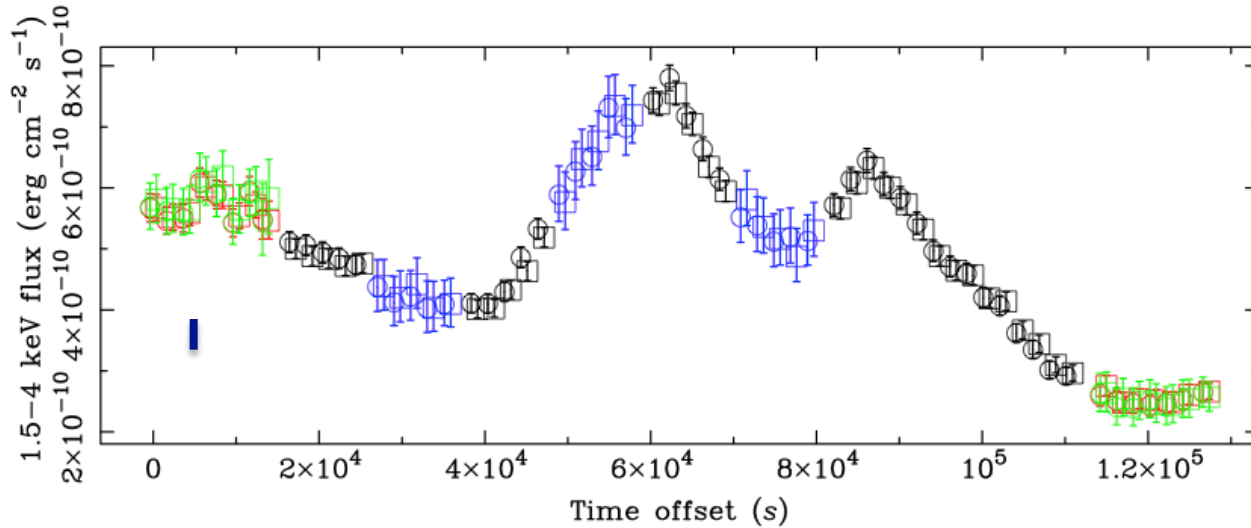
HEG
+A
MEG
+A
LEG+A
LEG+H

30-06-13



Mkn 421 Interleaved 1.5-4 keV

13-03-10



□ +
○ -

HEG

+A

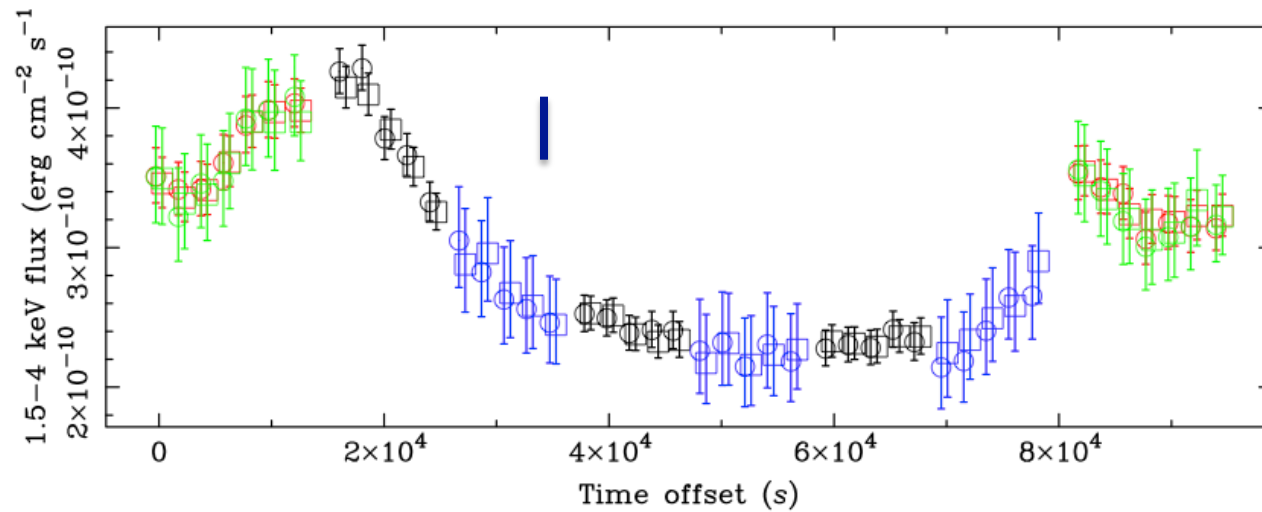
MEG

+A

LEG+A

LEG+H

30-06-13

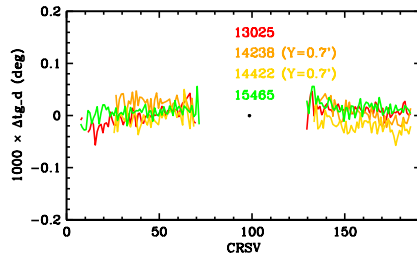
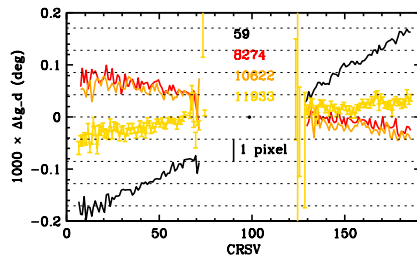
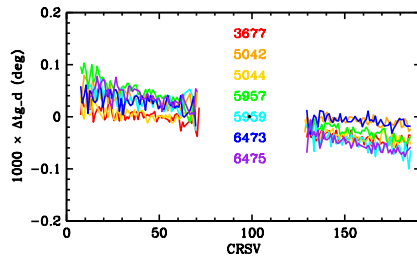
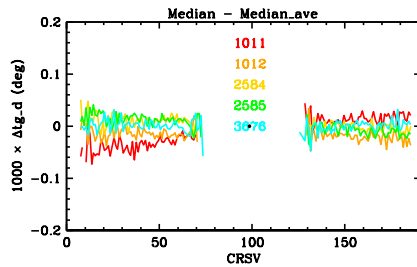


Present Calibration Activities

- Update ACIS contamination model, including: new time-dependence, elemental ratios, spatial gradients for each element and possibly a N component.
- Release revised gain tables for the BI chips (S1 and S3) to reduce residuals at low energies.
- Release a new OSIP file consistent with the new gain table.
- Adjust 0th order HETG efficiency.
- Adjust the HRC-S QE and LETG 1st order efficiency.

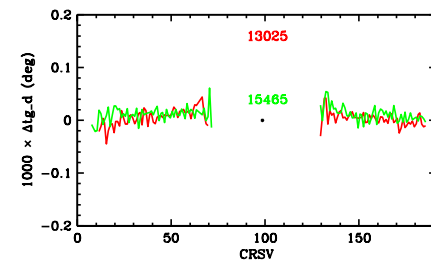
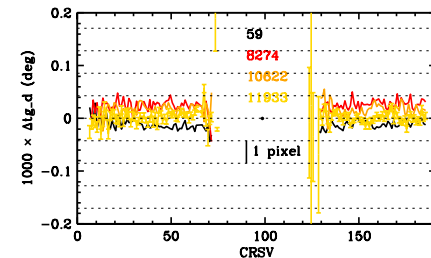
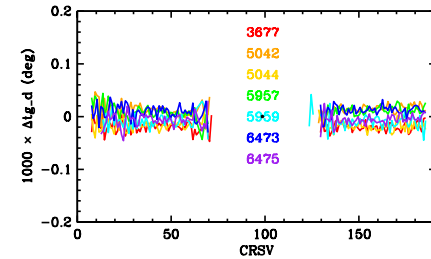
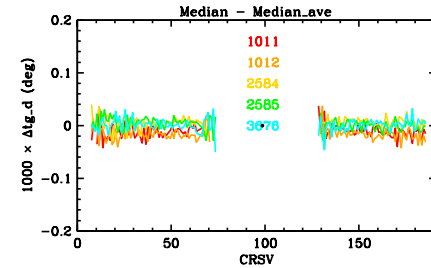
LETG/HRC-S Calibration

Uncorrected

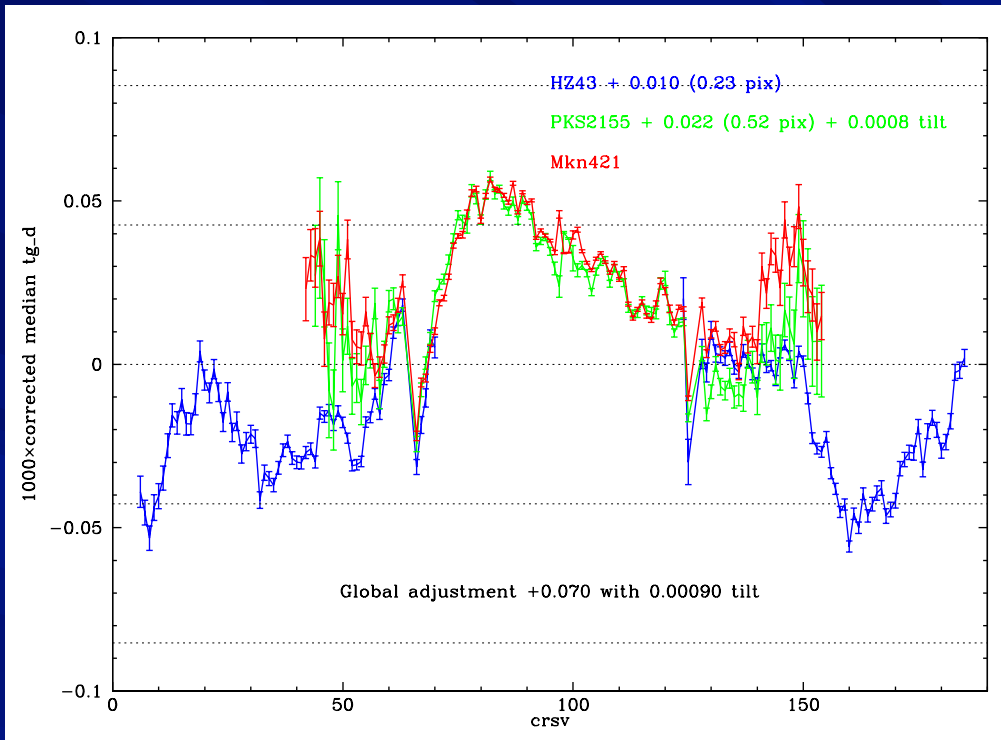


Time-dependent
tilt in the
dispersion axis

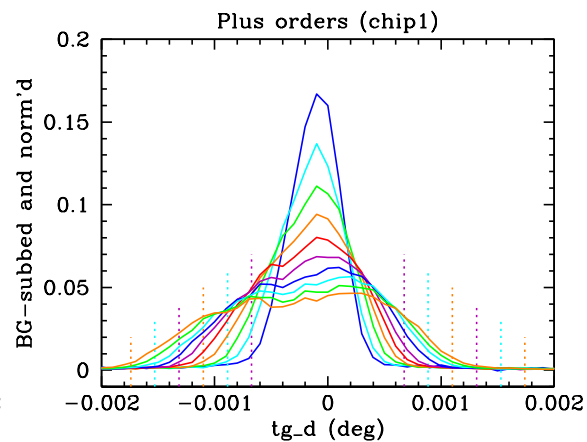
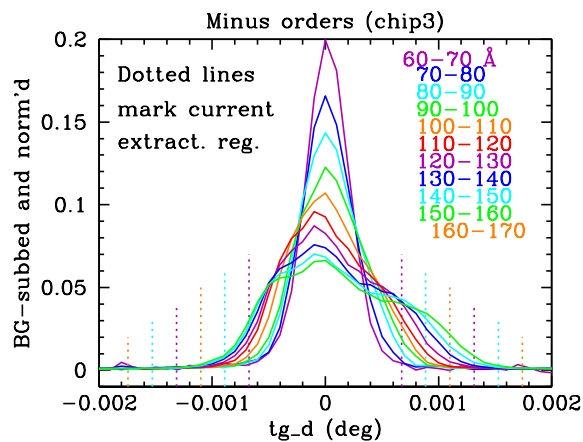
Corrected



LETG/HRC-S Calibration

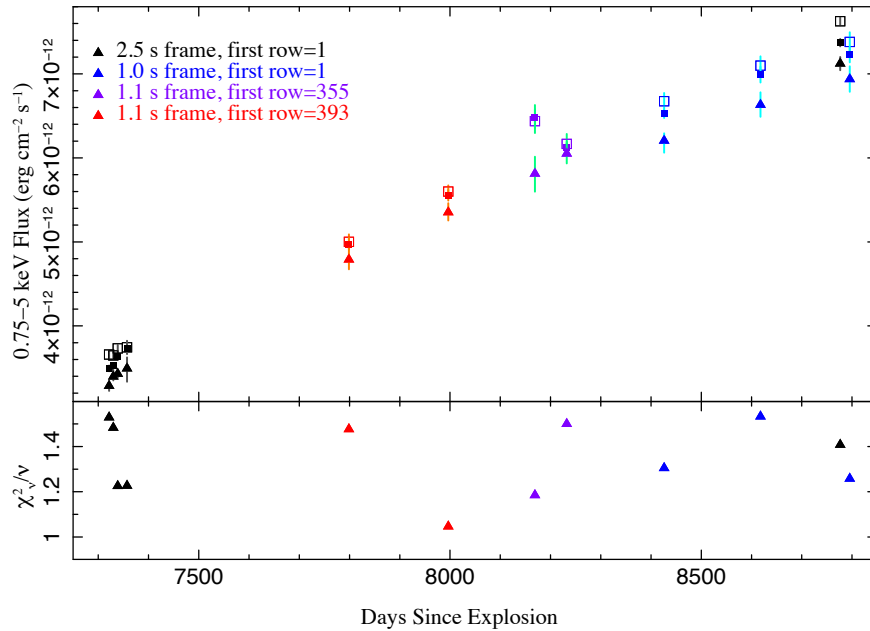


After correcting for time-dependent tilts and 0th order position. With these corrections the extraction region and background can be reduced by 25%



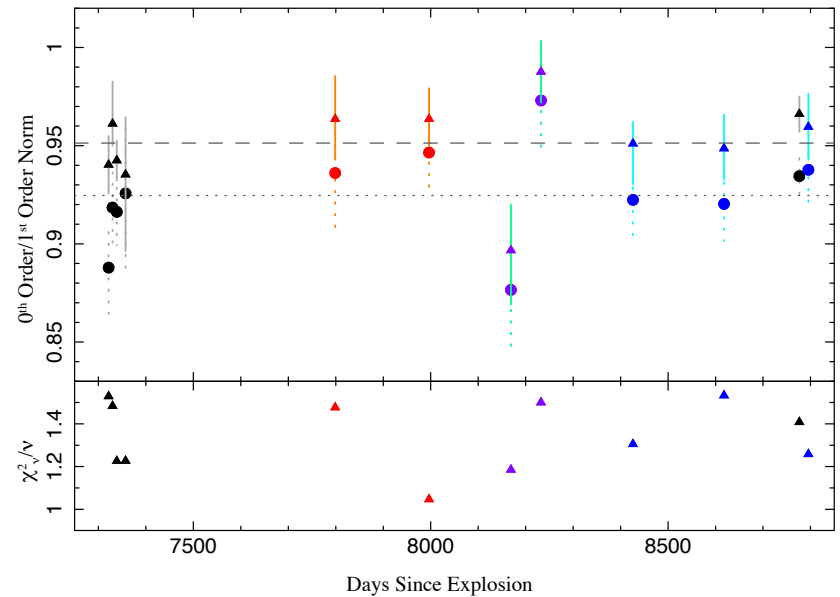
New Version

HETG 0th Order Calibration



SN 1987a
0.5-5keV band

Triangles – fit to 0th order
Empty squares – model independent flux
Filled squares – simultaneous fit to 0th and 1st order.



Chandra Internal Cross-Calibration with Mkn 421

