

Progress of Cross Calibration Projects

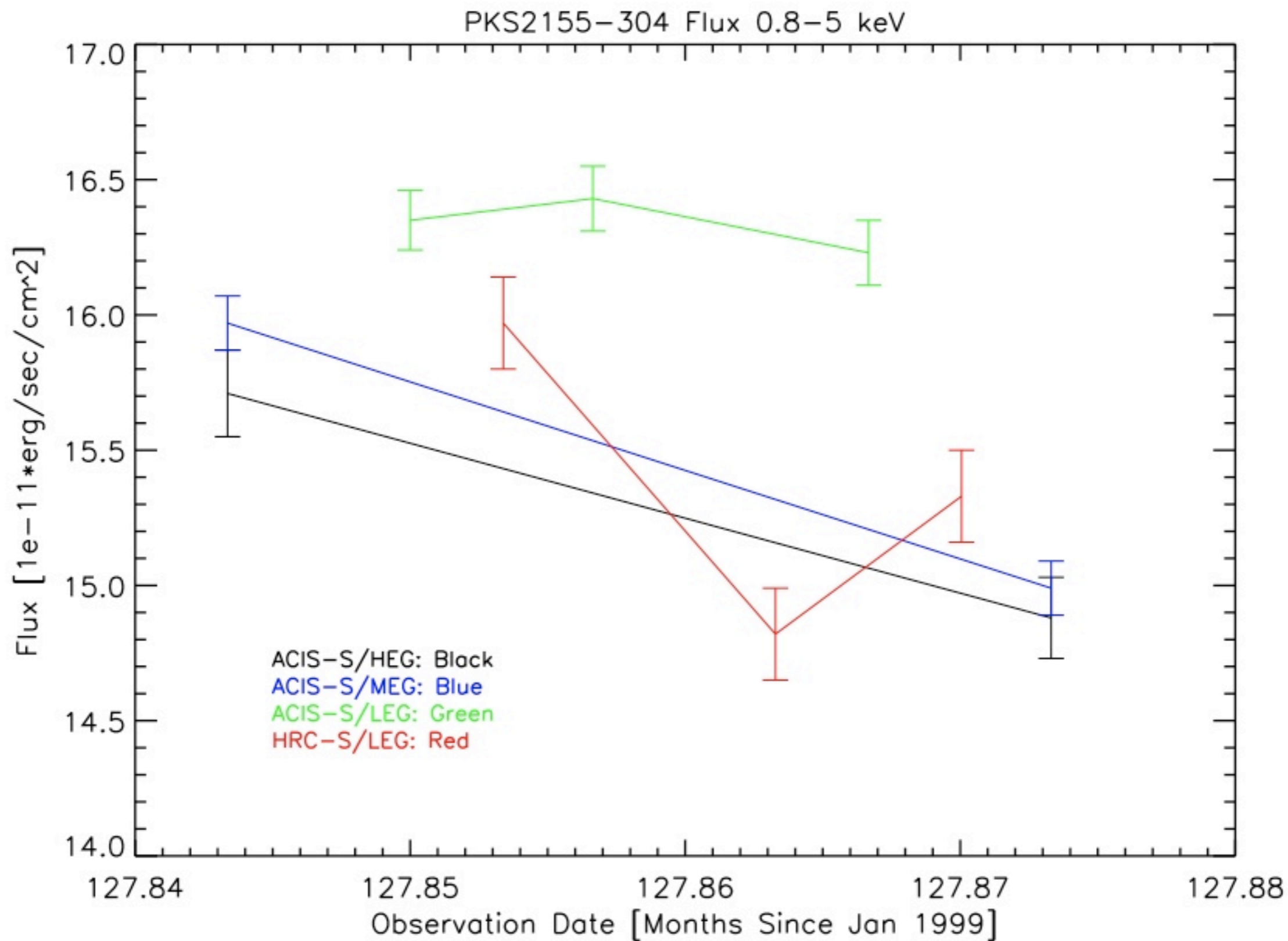
Herman L. Marshall (MIT)

IACHEC 2011

What's taking so long?

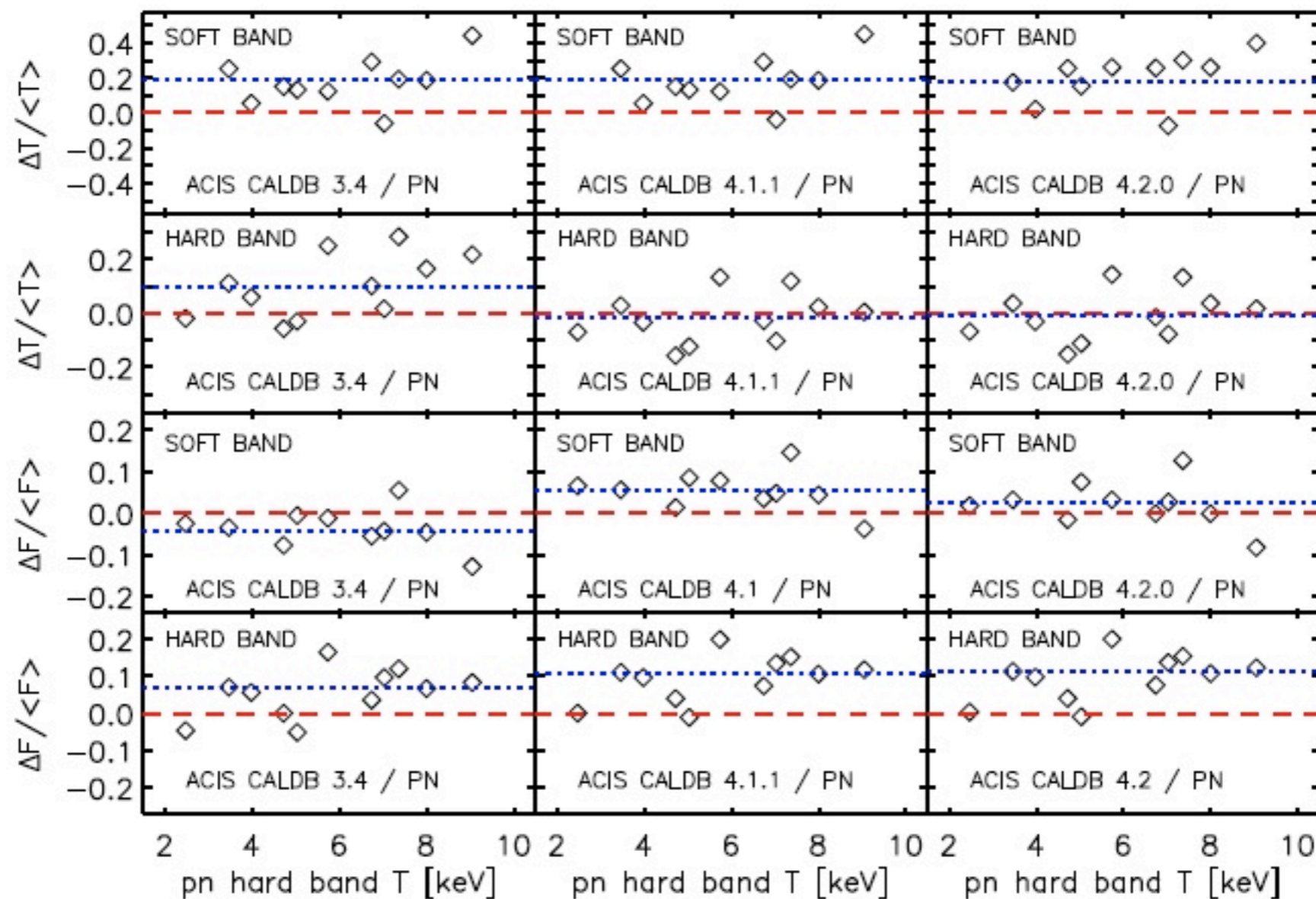
- Internal Cross-calibration (XMM, Chandra)
- ACIS contamination temporal and spectral changes
- Cross calibration
 - Nevalainen, David, and Guainazzi (2010) using galaxy clusters
 - Tsujimoto et al. (2011) using G21.5-0.9
- Papers in progress!
 - XMM-Newton/Chandra (M. Smith et al.)
 - Suzaku/XMM-Newton/Chandra (M. Ishida et al.)
 - Several observatories' E0102 data (Plucinsky et al.)

Chandra Grating Cross-Cal



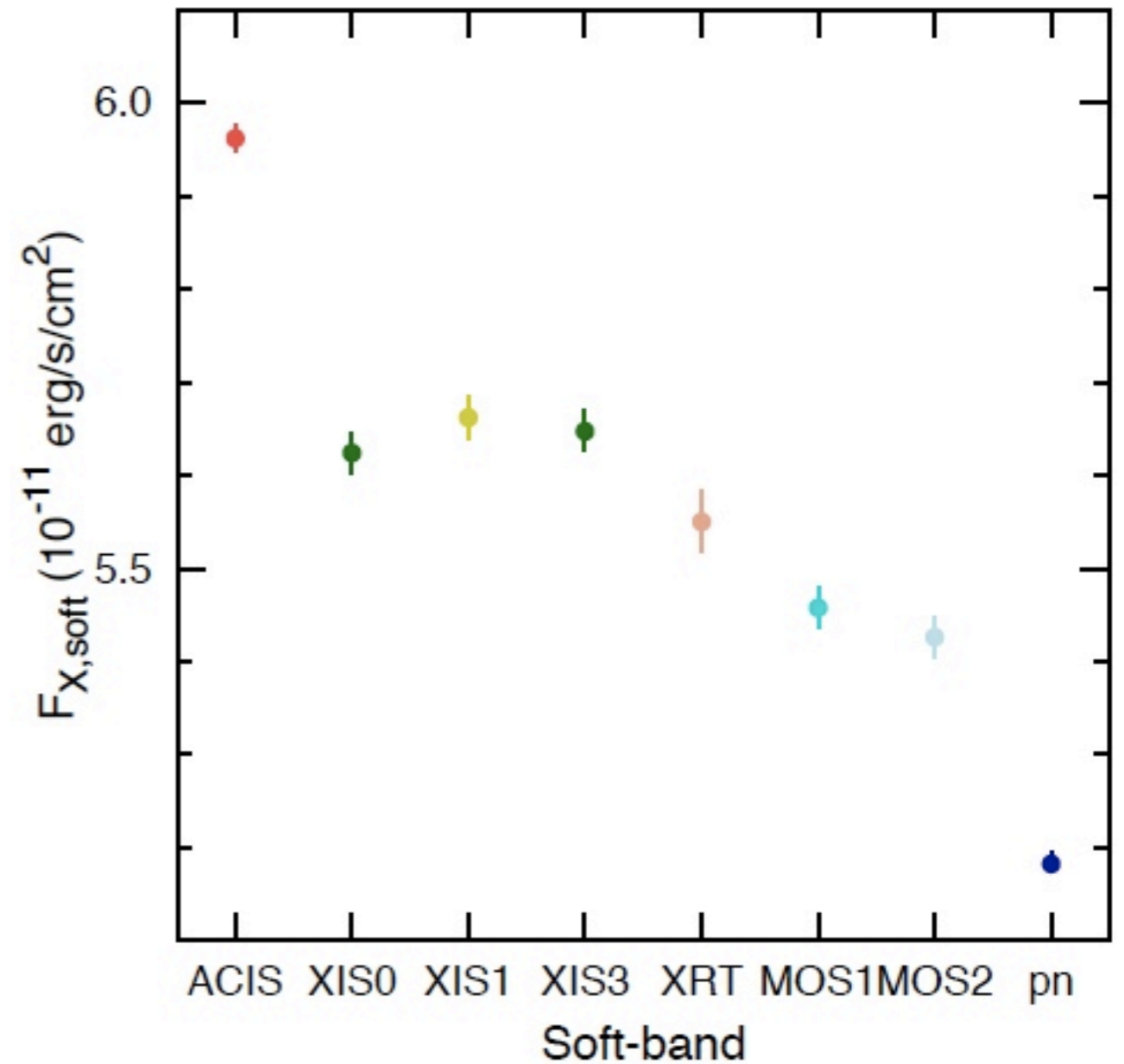
Cross-Cal with Clusters

- XMM-Newton/Chandra fits to cluster spectra
- IACHEC product (Nevalainen, David, and Guainazzi 2010)



Cross-Calibration: G21.5-0.9

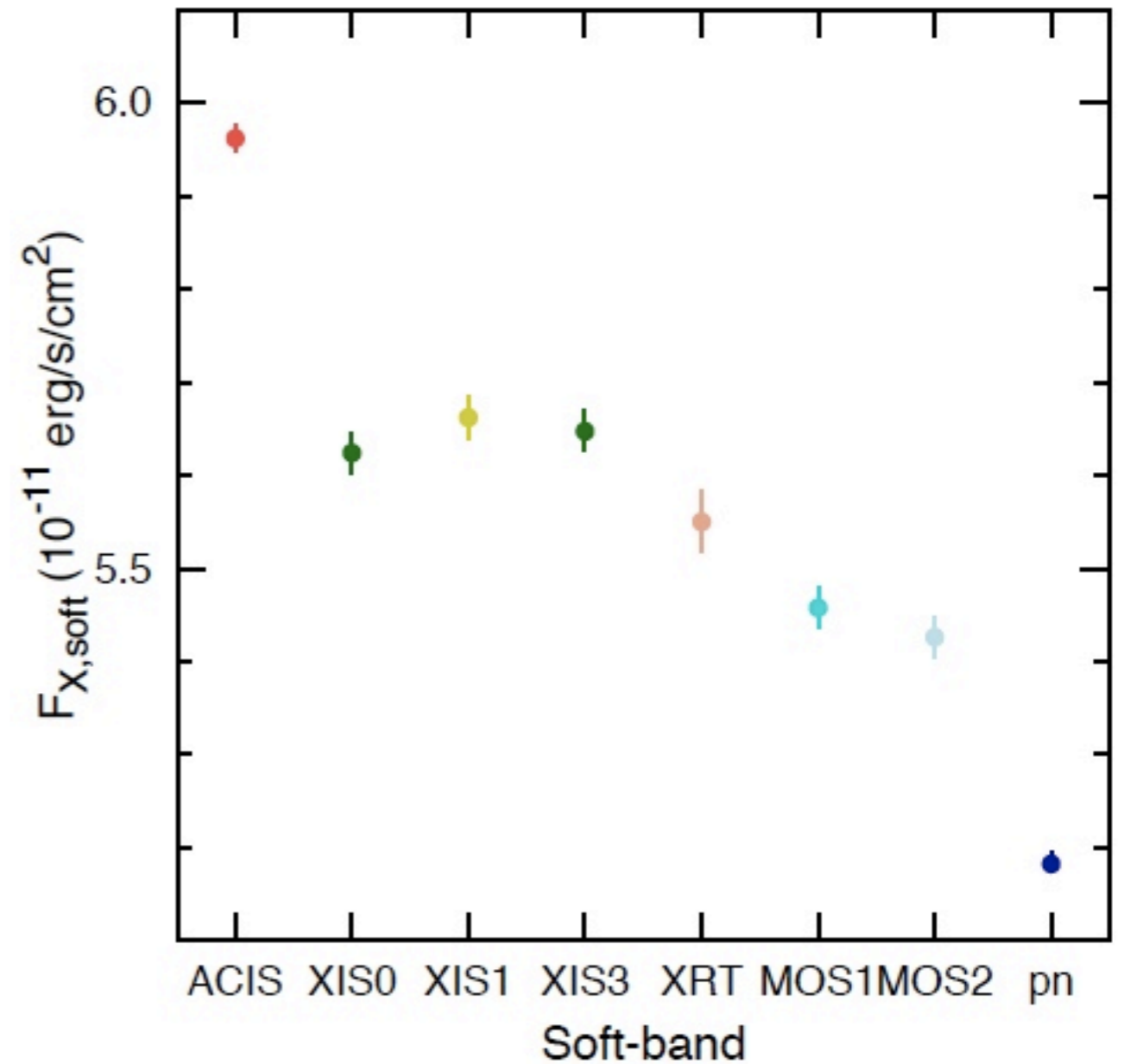
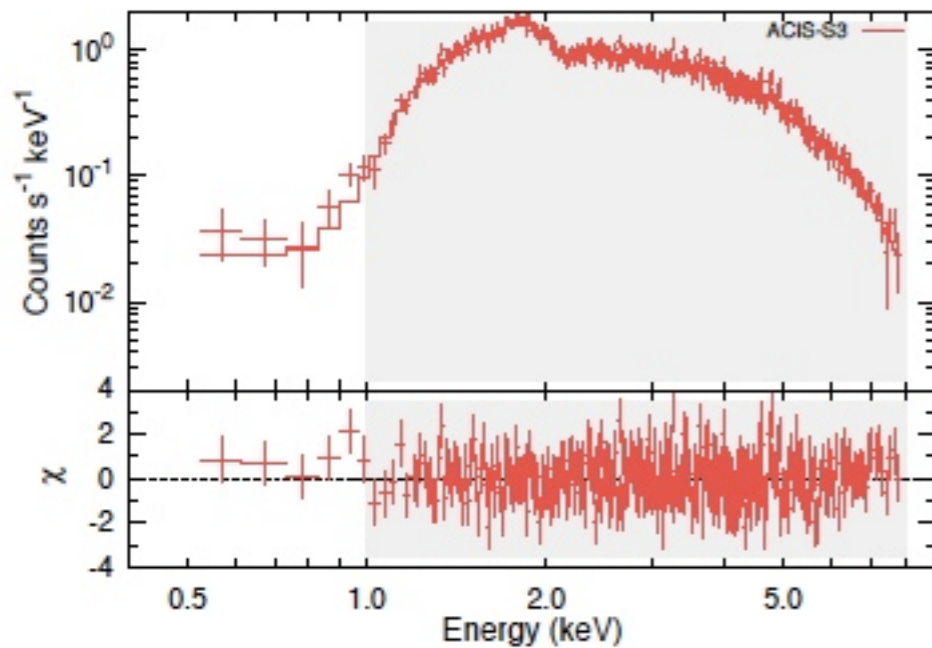
- Tsujimoto et al. (2011)
- Direct result of IACHEC
- Good news: OK to $\pm 7\%$
- Bad news: 15% pn-ACIS
 - SAS 10, ciao 4.2



(1.0 - 8.0 keV)

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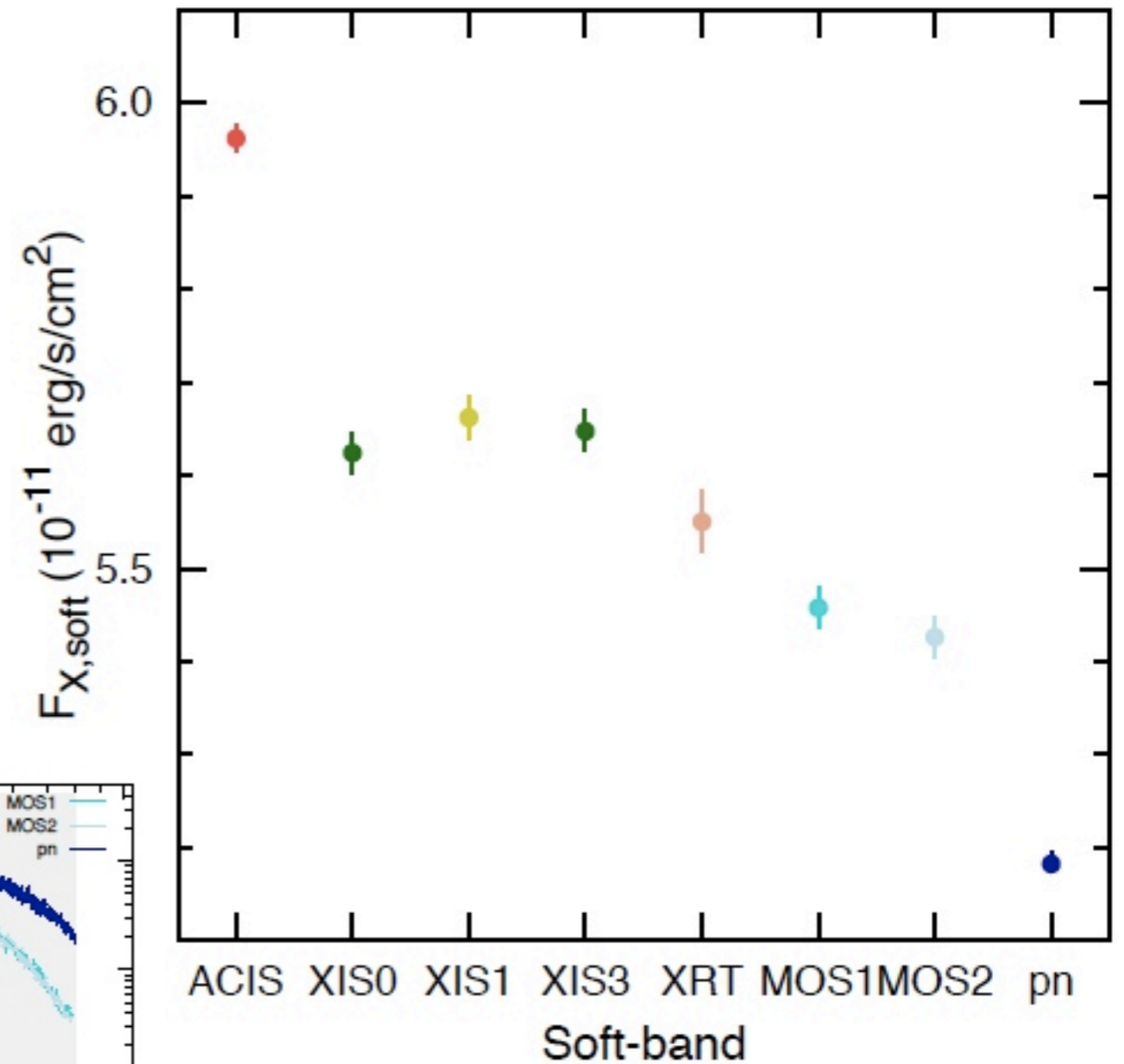
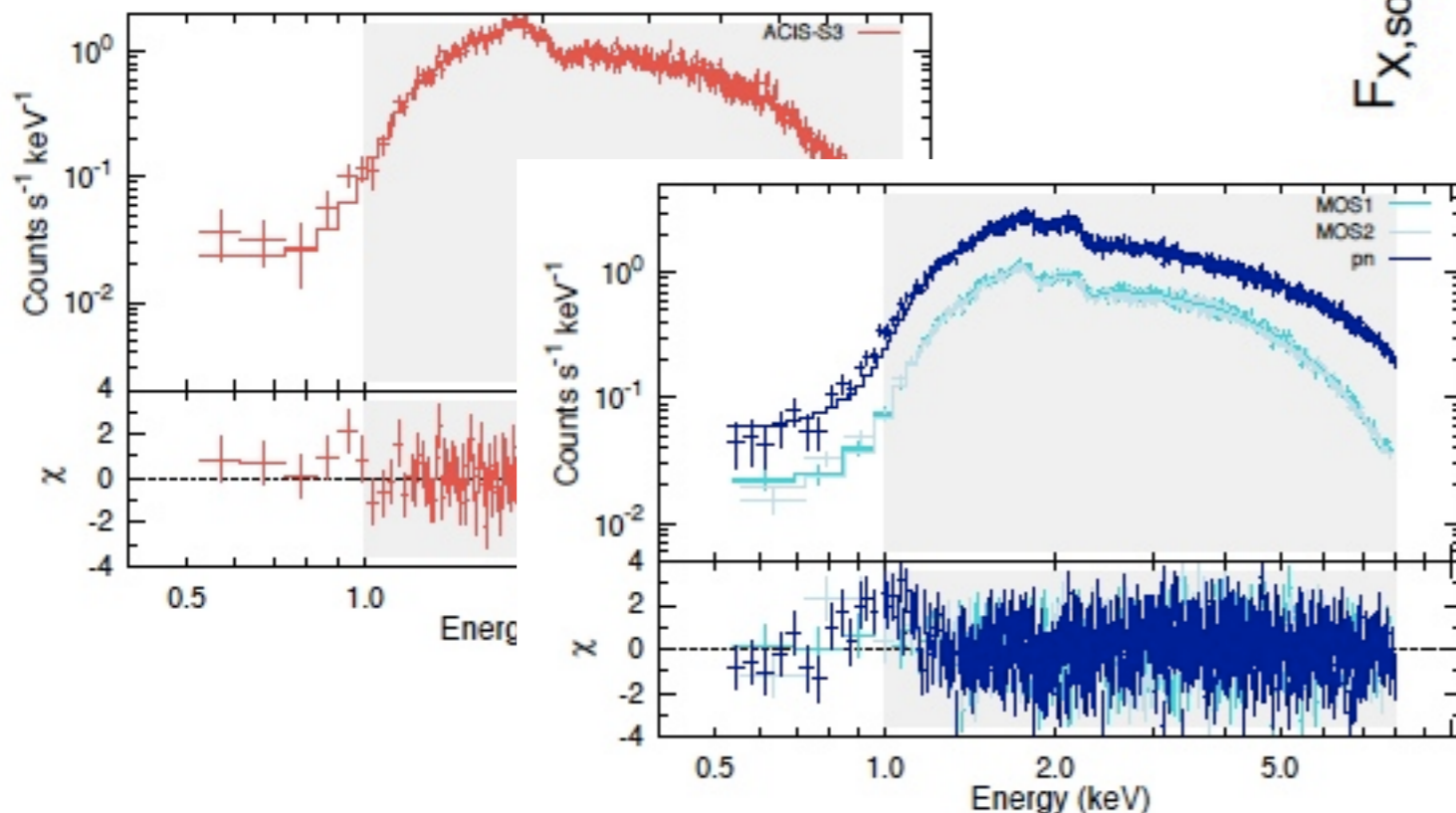
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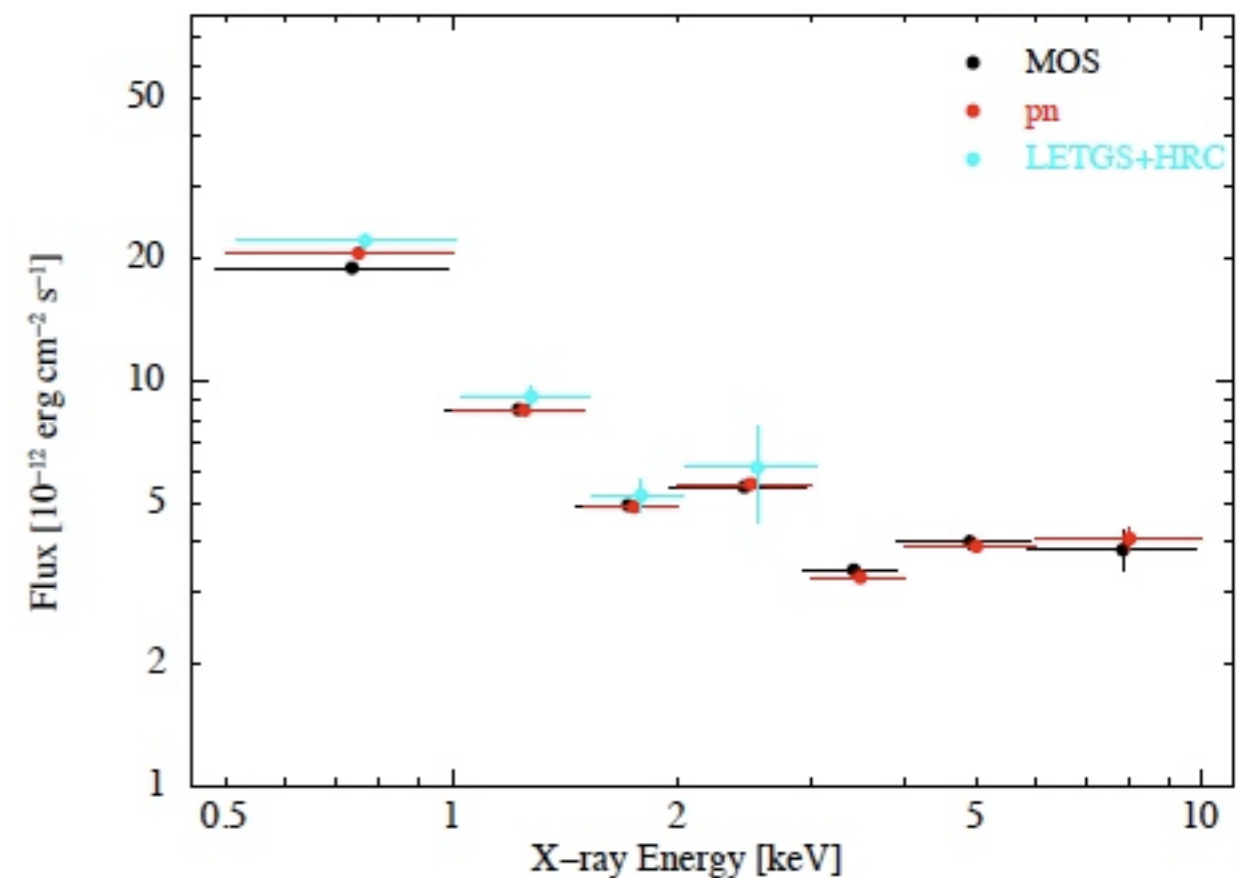
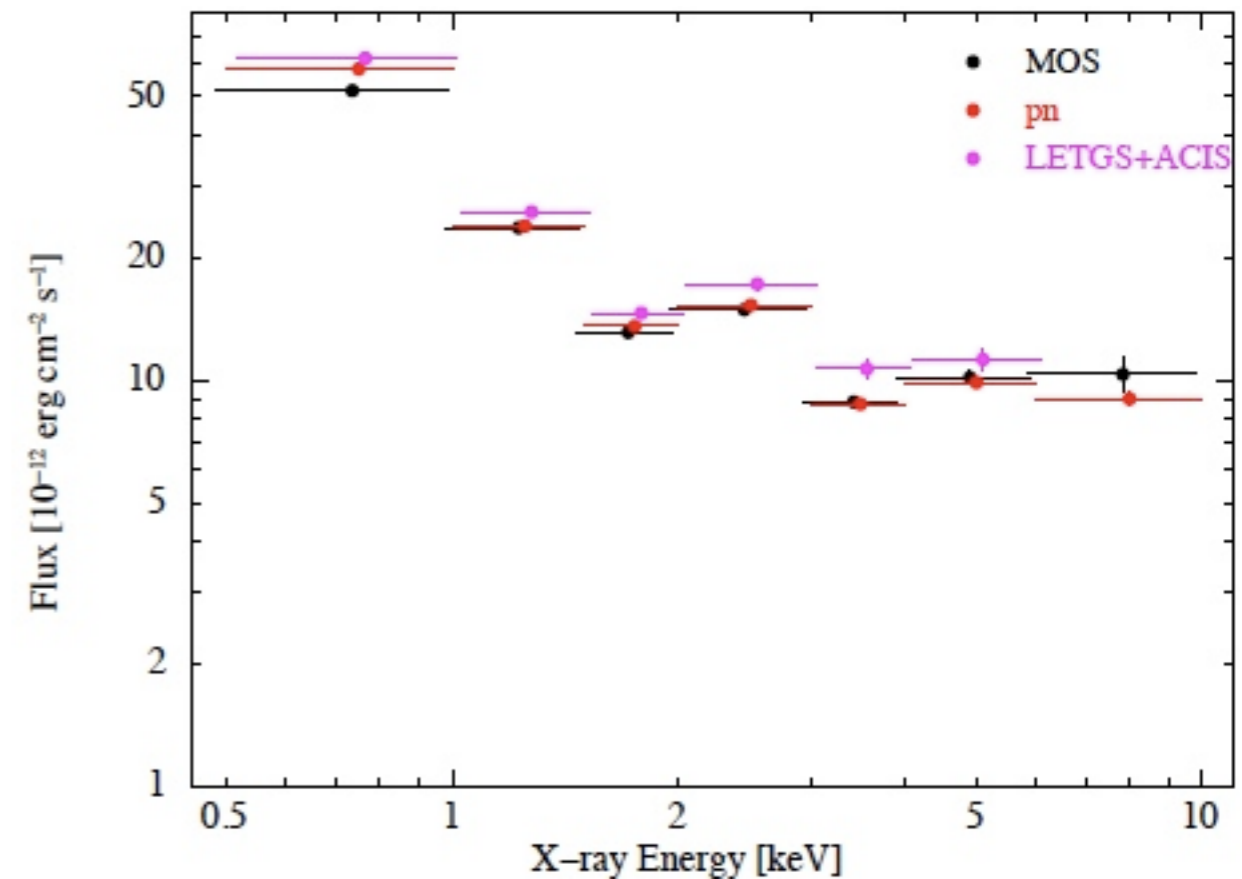
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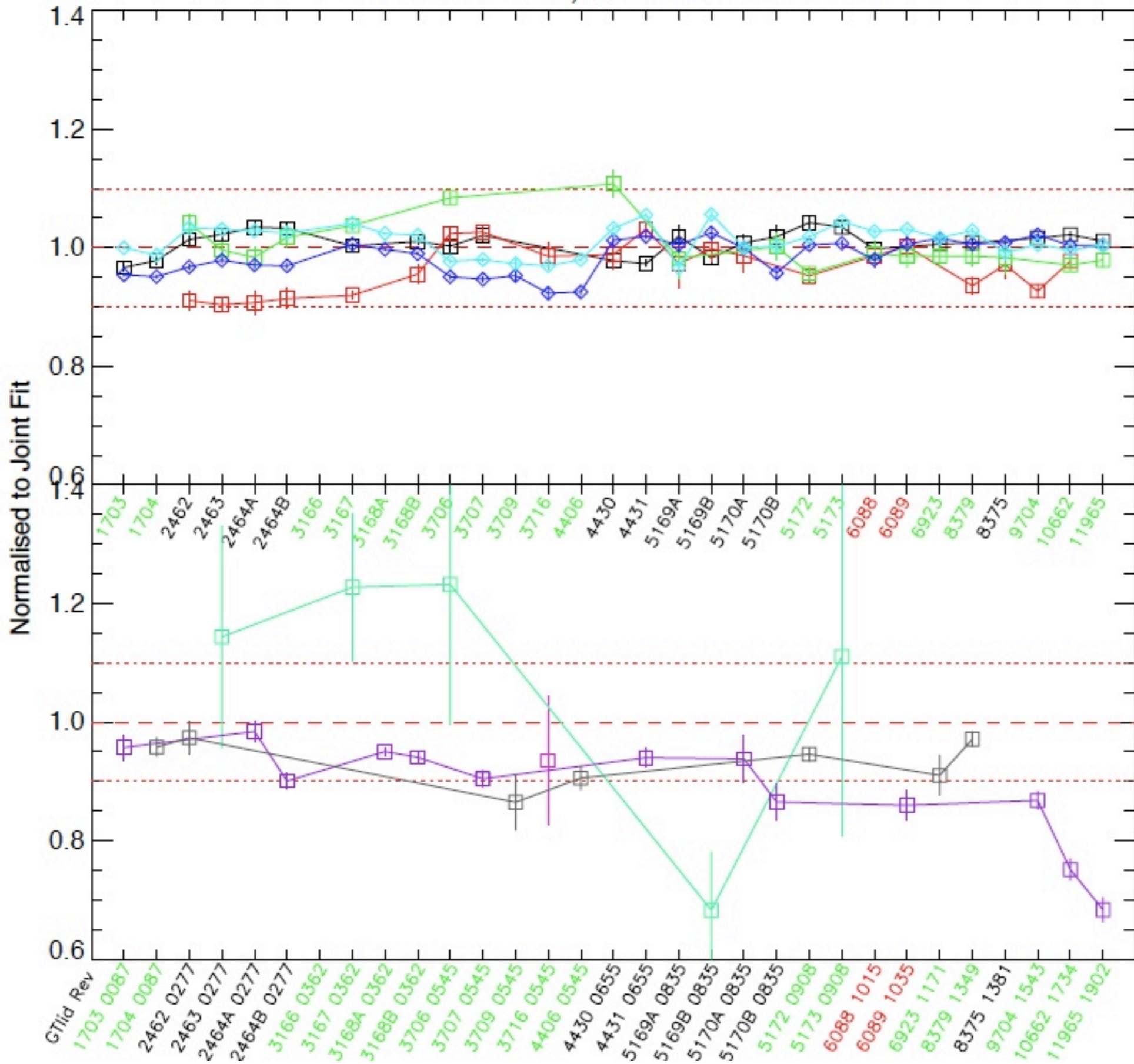
(1.0 - 8.0 keV)

Cross-calibration with PKS 2155

- Ishida et al (in prep.)
- Direct result of IACHEC
- Joint Suzaku, XMM, & Chandra
- Each combination examined
- Overall fits to power law
- Fluxes in bands (by PL fits)
- No conclusion yet....



Normalised Flux, 0.33 - 0.54 keV Band

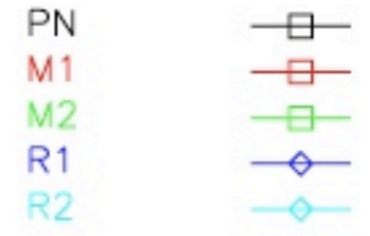
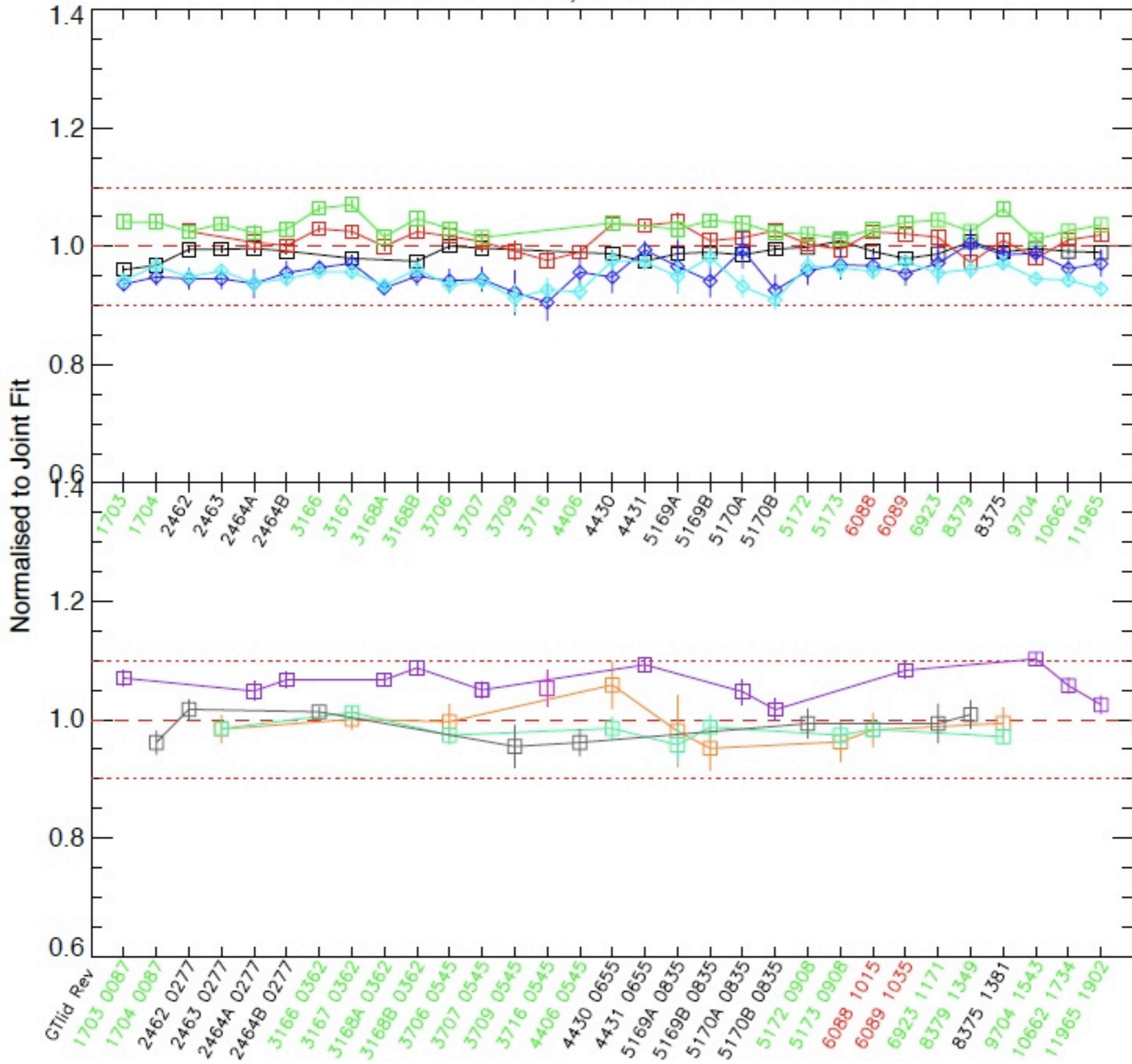


From
Michael Smith

ACISS-LEG
ACISS-MEG
ACISS-HEG
HRCS-LEG
HRCI-LEG

Flux Method: II
Version:
SAS11.0 - CIAO4.3/CALDB4.4.2 Chi2
Targets:
3C273
H1426+428
PKS2155-304

Normalised Flux, 0.85 - 1.50 keV Band

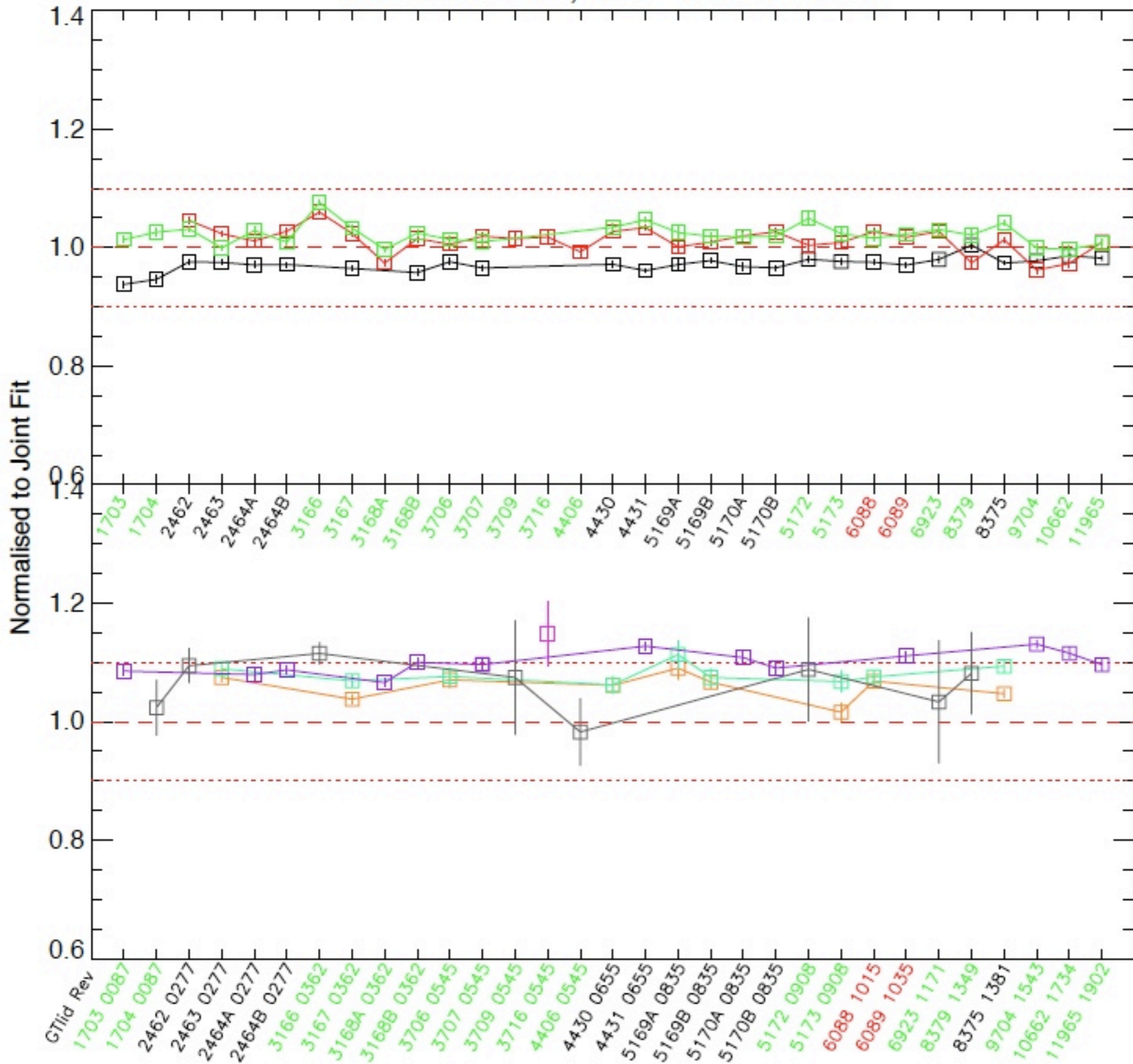


From
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Flux Method: II
Version:
SAS11.0 - CIAO4.3/CALDB4.4.2 Chi2
Targets:
3C273
H1426+428
PKS2155-304

Normalised Flux, 1.50 - 4.00 keV Band



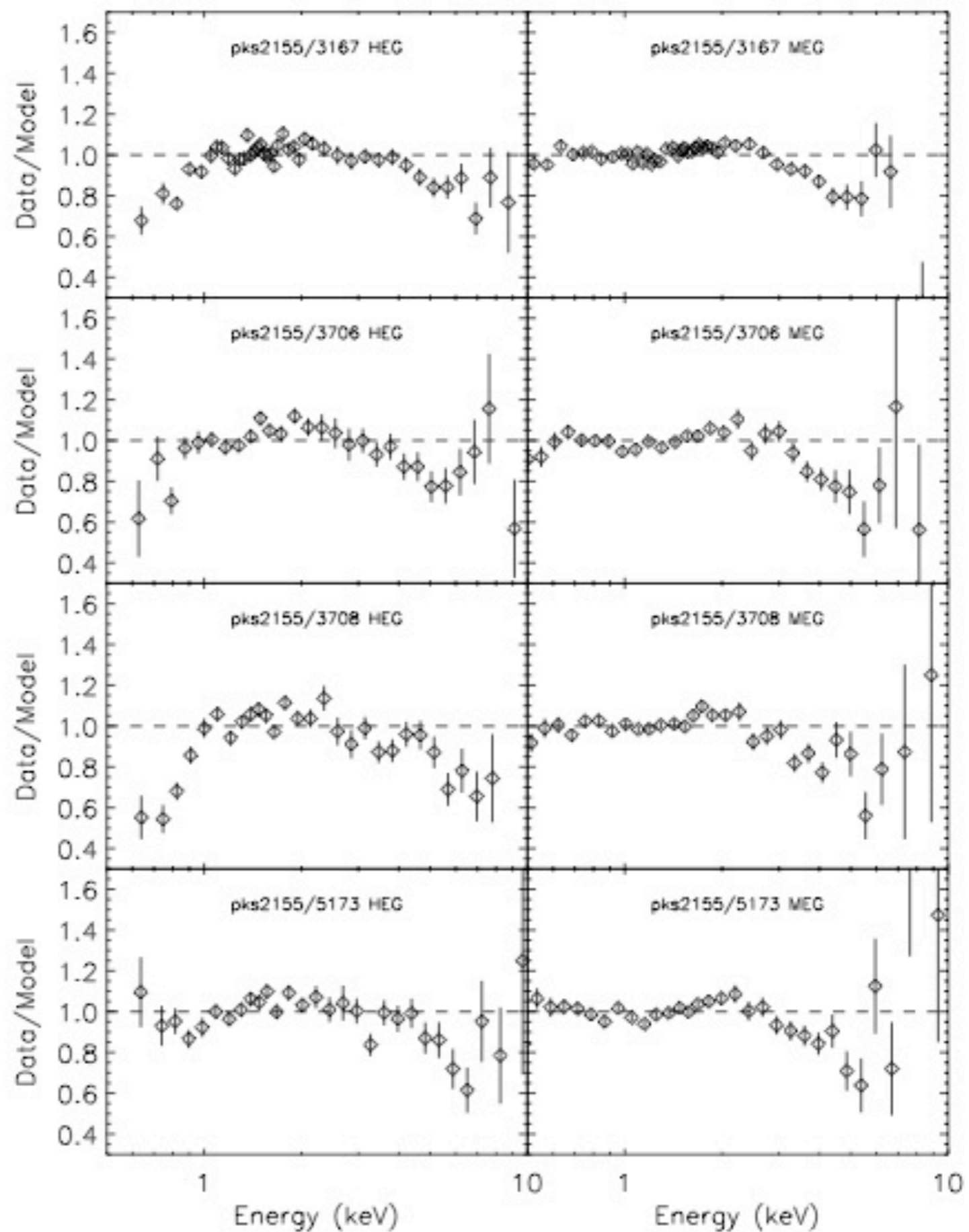
PN
M1
M2
R1
R2

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Blazar Spectra — Simple?



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- No...: What shall be fixed?
 - No fixes resulting from Tsujimoto et al., Ishida et al., Smith et al. papers
 - See study of “relative calibration” in statistics literature
 - Fit blazar spectra globally?
 - Small systematic errors --> not getting $\chi^2 = 1$