

Cross-Calibration between XMM-Newton and Chandra

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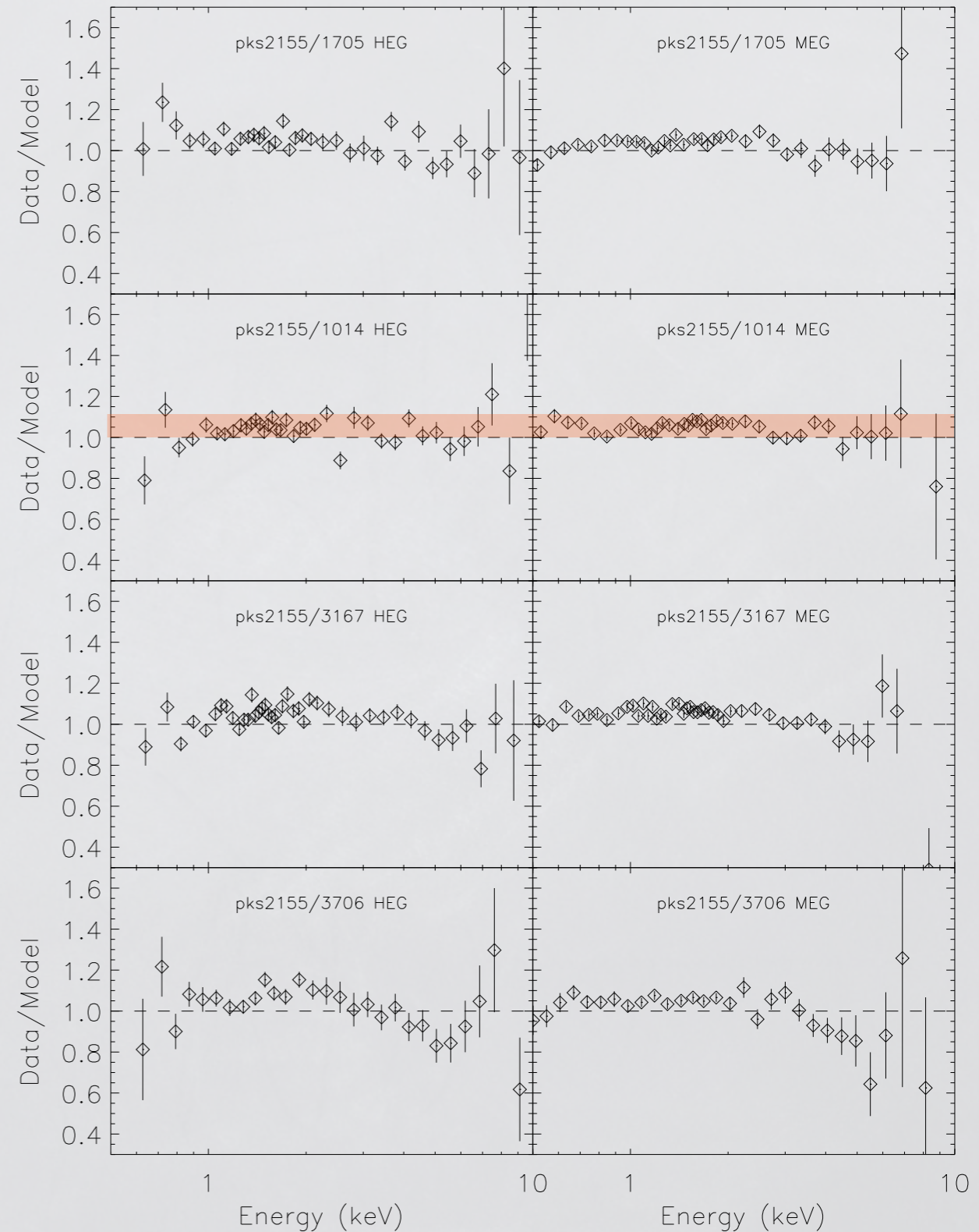
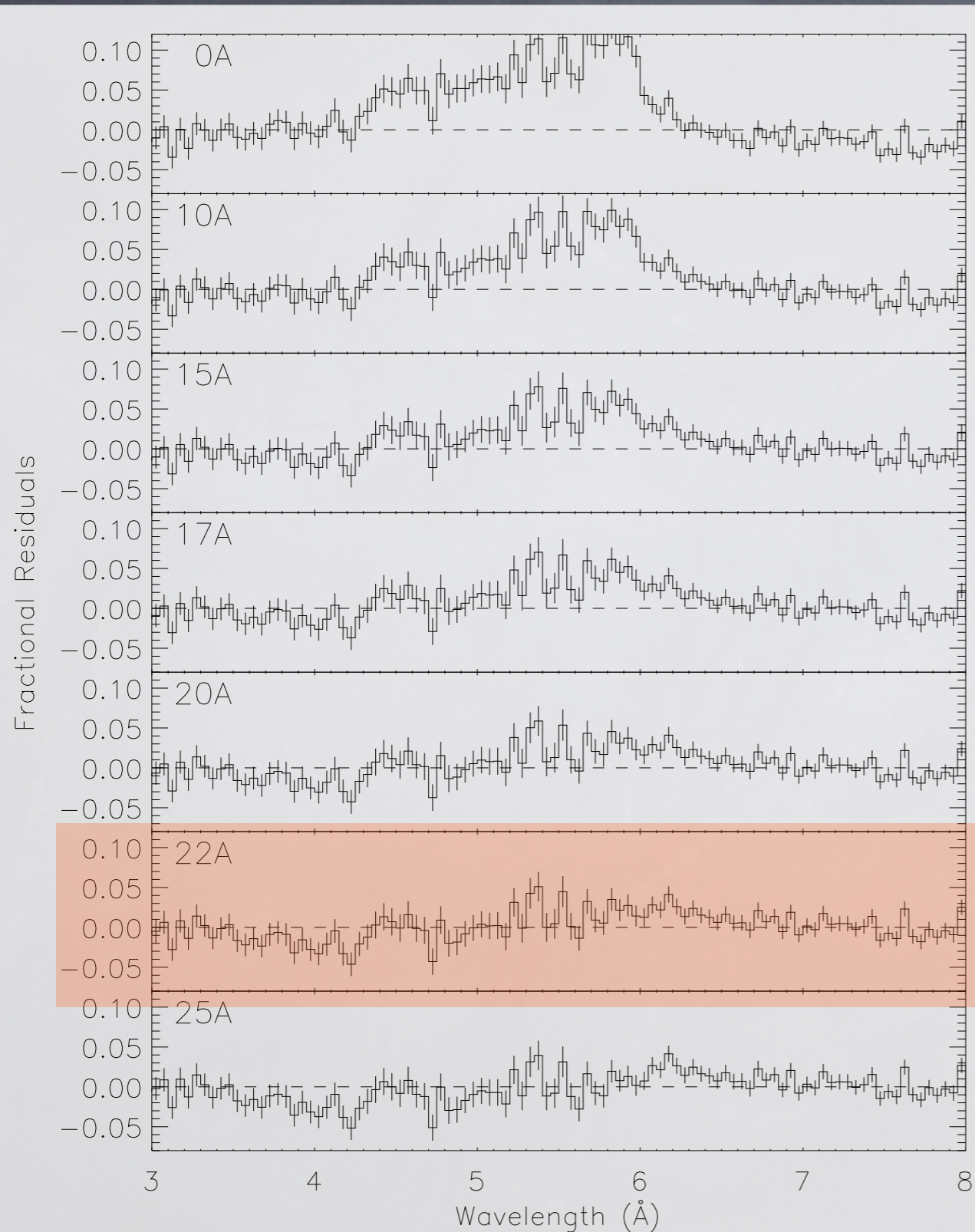
Overview

- XMM/Chandra Cross-calibration telecons underway
 - started monthly meetings in May
 - Web-based whiteboard used for reports
- Significant progress on Chandra internal cal
- Good progress on XMM internal cal
- One new cross-cal campaign executed
- Attending meetings for joint cal discussions
- Implementing cross-cal with Suzaku

Progress on Chandra Internal Calibration

- Analysis of HETGS data completed
 - see http://space.mit.edu/ASC/calib/heg_meg/meg_heg_report.pdf
 - Updated HEG and MEG efficiencies (ECR)
- HRMA reflectivities updated (ECR)
 - Eliminates Ir-M edge residuals

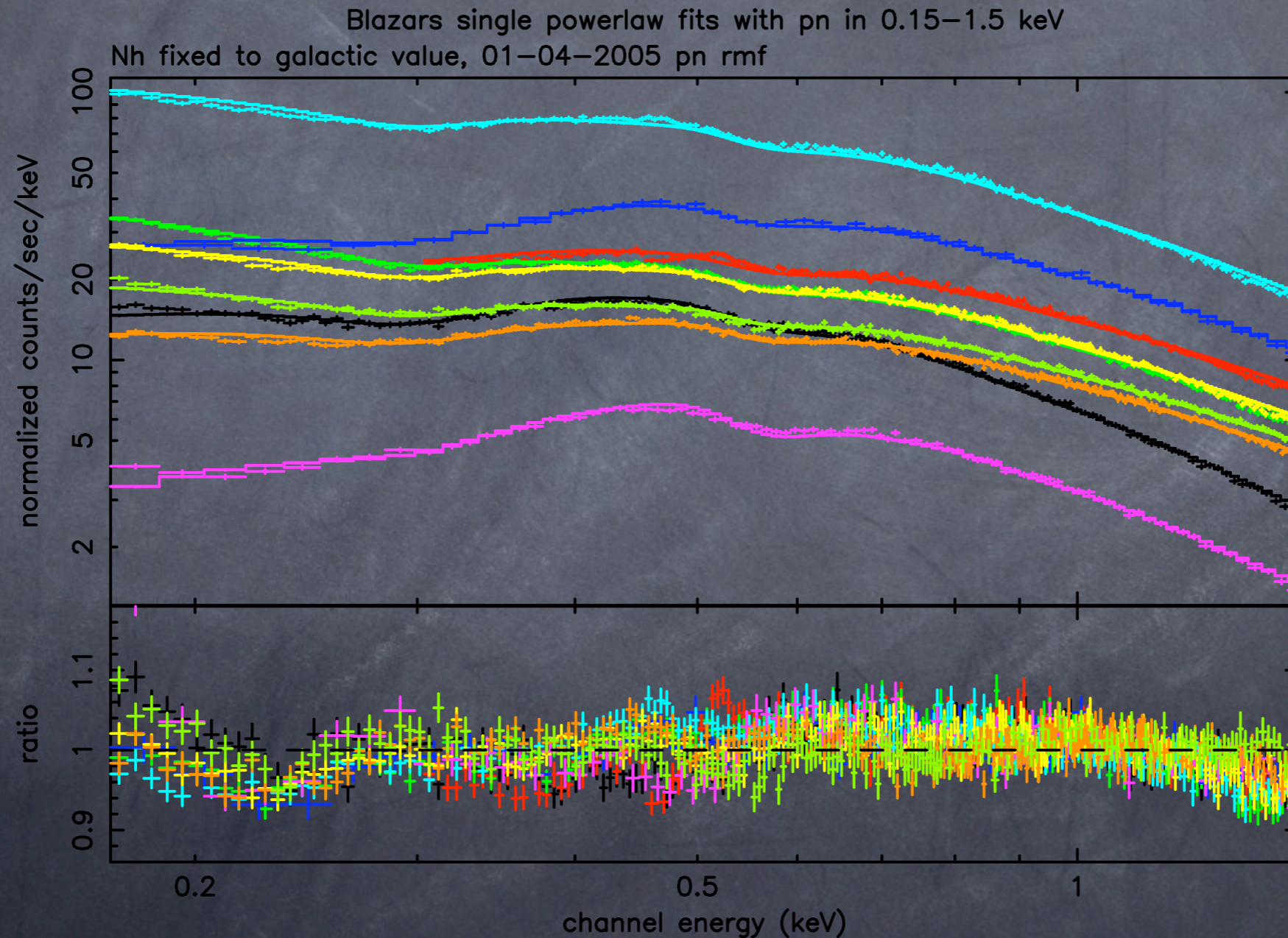
Residuals Reduced to <5%



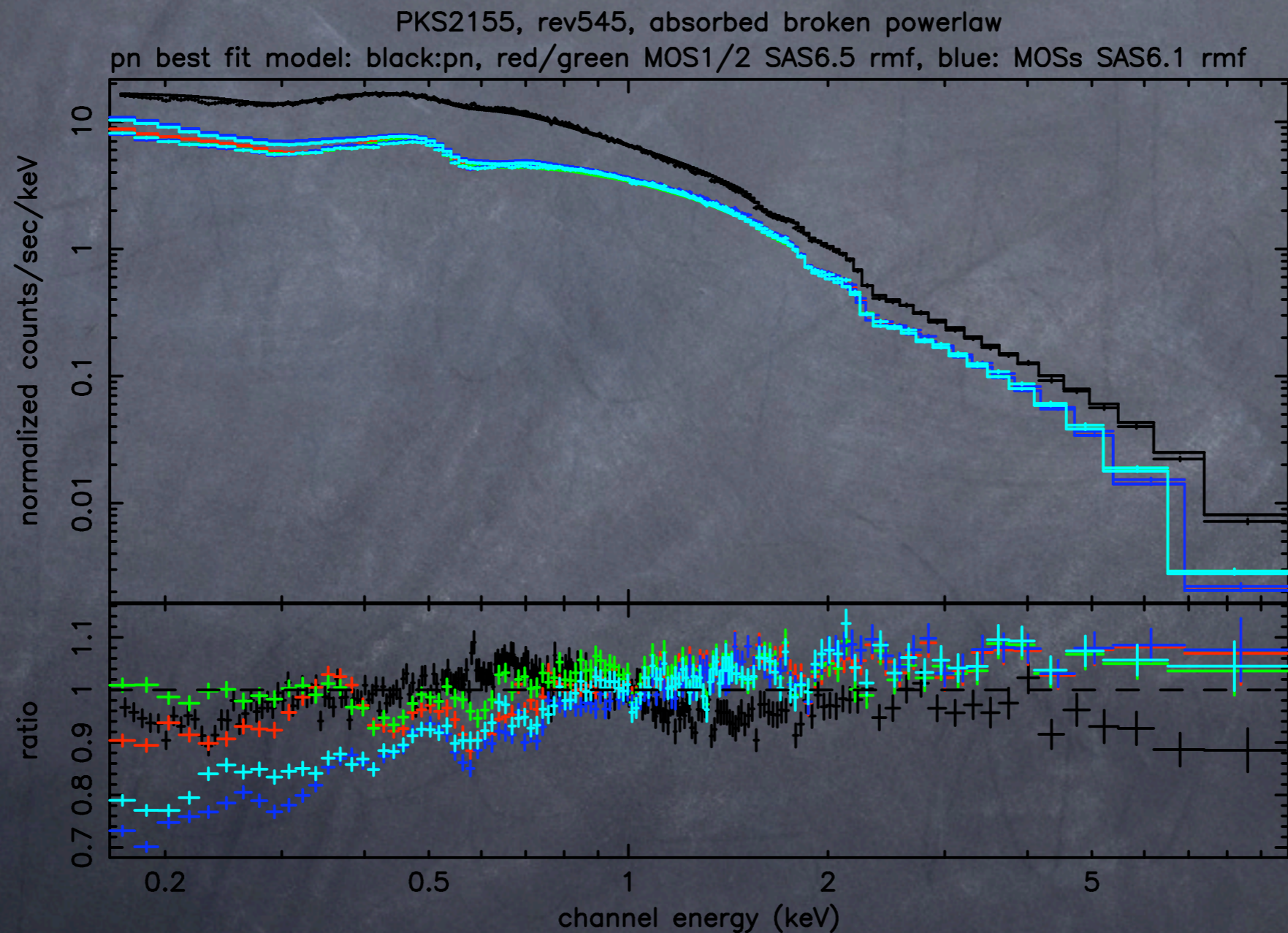
Progress on XMM Internal Calibration

- PN shows +10% residuals below 0.2 keV relative to pure power law fit
- Upgrading to SAS 6.5 significantly improves MOS results — better than +/- 10%
- RGS is low by >15% below 0.5 keV relative to PN and MOS
- HETGS is within 10–15% of PN before Ir–M edge fix

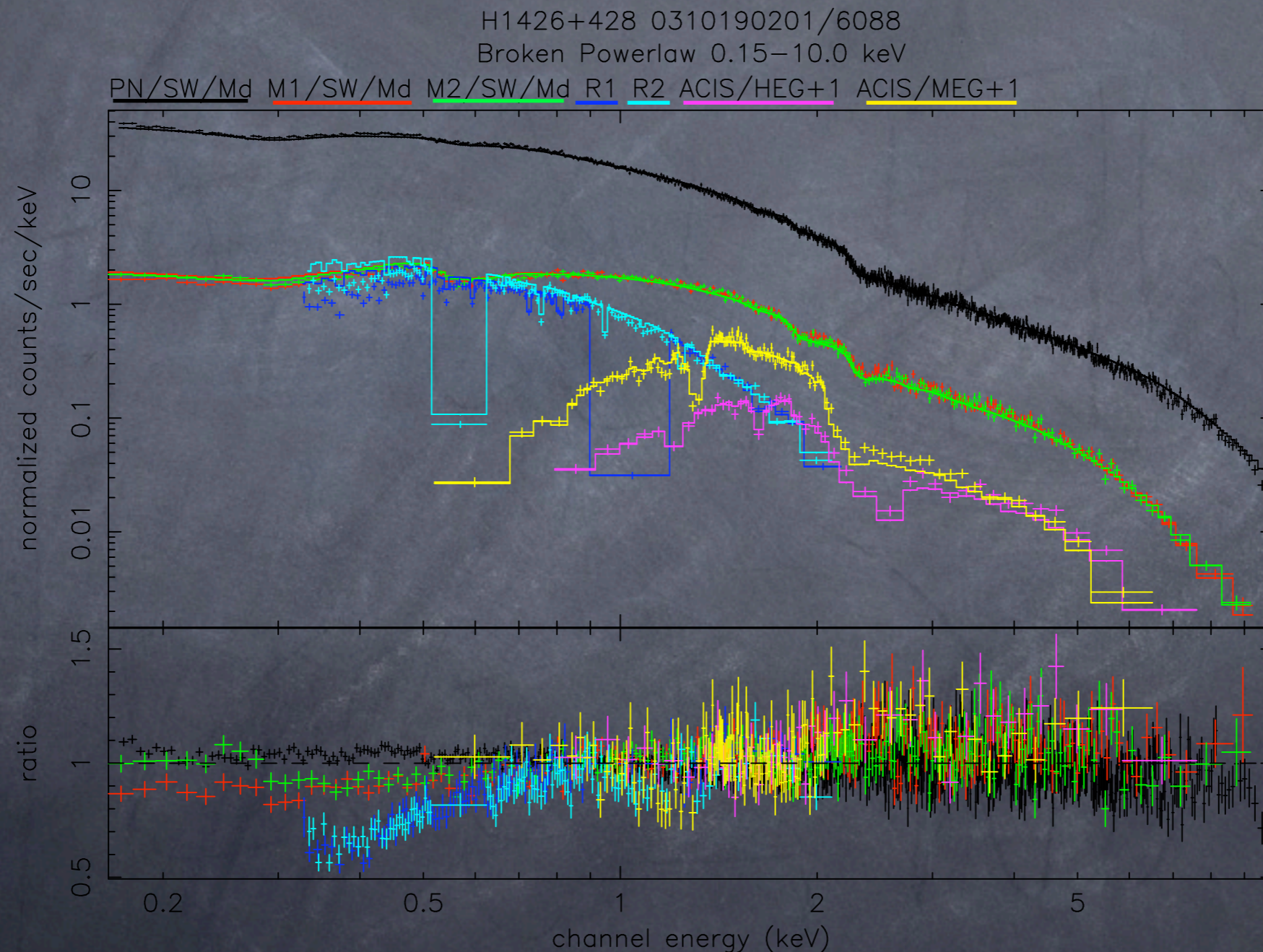
PN Residuals < 10% in 0.2–2.0 keV range



MOS Residuals < 10% in 0.2–2.0 keV range



RGS Residuals < 15% below 0.5 keV, HETGS TBD



XMM/Chandra Blazar Observations to Date

XMM-Chandra Cross-Calibration Observations of AGN										
Target	XMM				Chandra					
	Rev	Seq #	Start Date	exp (ks)	Config	Obs ID	Start Date	exp (ks)	A	Γ
PKS 2155-304	87	124930101	2000-05-30:0530	61	HETGS	1705	2000-05-31:1740	30	0.037	2.52
		124930201	2000-05-31:0030	72	LETG/ACIS	1703	2000-05-31:0220	30	0.041	2.64
					LETG/HRC	1704	2000-05-31:0950	30		
3C 273	94	126700301	2000-06-13:2340	73	ACIS-S	1711	2000-06-14:0550	30		
	95	126700601	2000-06-15:1300	31	ACIS-S	1712	2000-06-14:1420	30		
	95	126700701	2000-06-15:2330	36						
	96	126700801	2000-06-17:2320	73						
	277	136550101	2001-06-13:0710	90	HETG	2463	2001-06-13:0700	30	0.024	1.73
		136550201	2001-06-13:0540	5	LETG/ACIS	2464	2001-06-13:1610	30		
PKS 2155-304	362	89210101	2001-12-01:0600	15	HETGS	3167	2001-11-30:2010	30	0.055	2.73
					LETG/ACIS	3168	2001-11-30:1120	30	0.031	2.98
					LETG/HRC	3166	2001-11-30:0230	30		
	545	124930601	2002-11-29:2330	115	HETGS	3706	2002-11-29:2230	30	0.02	2.71
					HETGS	3708	2002-11-29:1430	30	0.026	2.75
					LETG/ACIS	3707	2002-11-30:0700	30		2.91
					LETG/HRC	3709	2002-11-30:1450	15		
					LETG/HRC	4406	2002-11-30:0210	15		
3C 273	655	159960101	2003-07-07:1740	58	HETGS	4430	2003-07-07:1230	30	0.024	1.61
					LETG/ACIS	4431	2003-07-07:2050	30		
	835	136550801	2004-06-30:1300	63	HETGS	5169	2004-06-30:1300	30	0.014	1.52
					LETG/ACIS	5170	2004-06-30:2150	30		
PKS 2155-304	908	158960901	2004-11-22:2130	29	HETGS	5173	2004-11-23:2330	30	0.024	2.8
		158961001	2004-11-23:1950	40	LETG/HRC	5172	2004-11-22:2330	30		
1H1426+428	1015	310190201	2005-06-25:0603	45	HETGS	6088	2005-06-25:0555	45	0.014	1.97
	1035	310190501	2005-08-04:0452	47	LETG/ACIS	6089	2005-08-04:0436	45	0.019	2.23

Work in Progress

- Fits require changing spectral slope
 - 3C 273: a soft excess, broad Fe line (?)
 - BLLs: gradual steepening
 - Coordinate modeling between projects
- Setting common absorption assumptions
- Comparing ACIS-S3, PN, MOS of 1E0102-72
 - PN and ACIS disagree --> ignore doubles?
 - Some agreement between MOS and ACIS
 - Chi2 is worse for MOS and PN
- Setting up cross-cal with XMM and Suzaku
 - Target: PKS 2155-304 (was 3C 273)
 - Date range: 11/30-12/02
 - Will use LETG/HRC, LETG/ACIS, HETGS
- XMM and Suzaku may observe RXJ1856
 - No plans to coordinate with Chandra yet

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