

EPIC-pn

effective area and response

- Effective area above 4 keV
- Gain/CTI correction TI mode
- Re-distribution

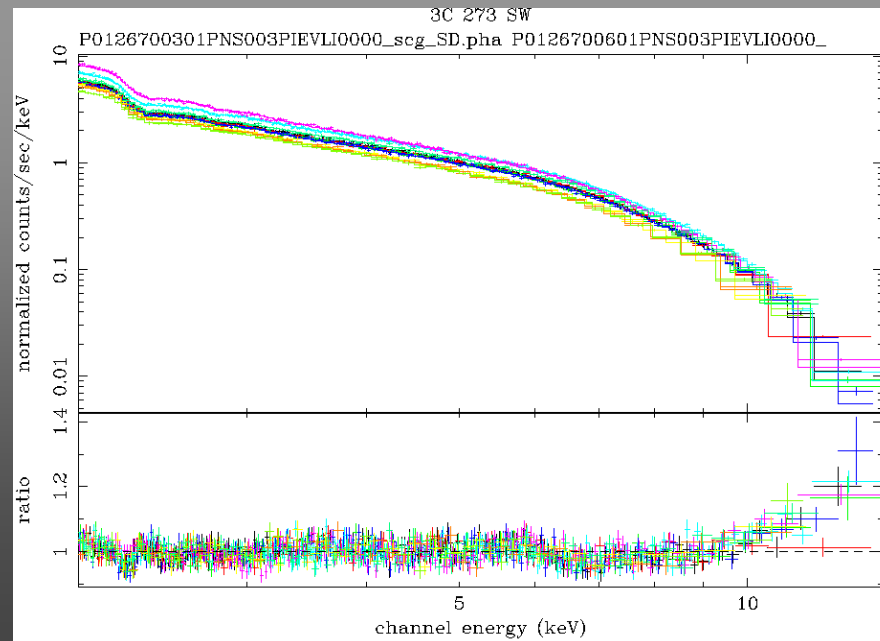
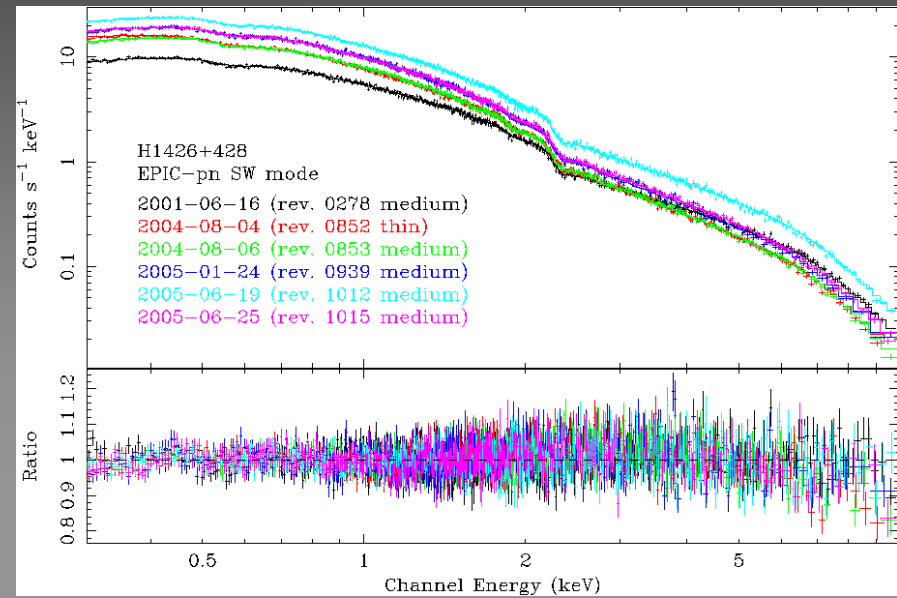
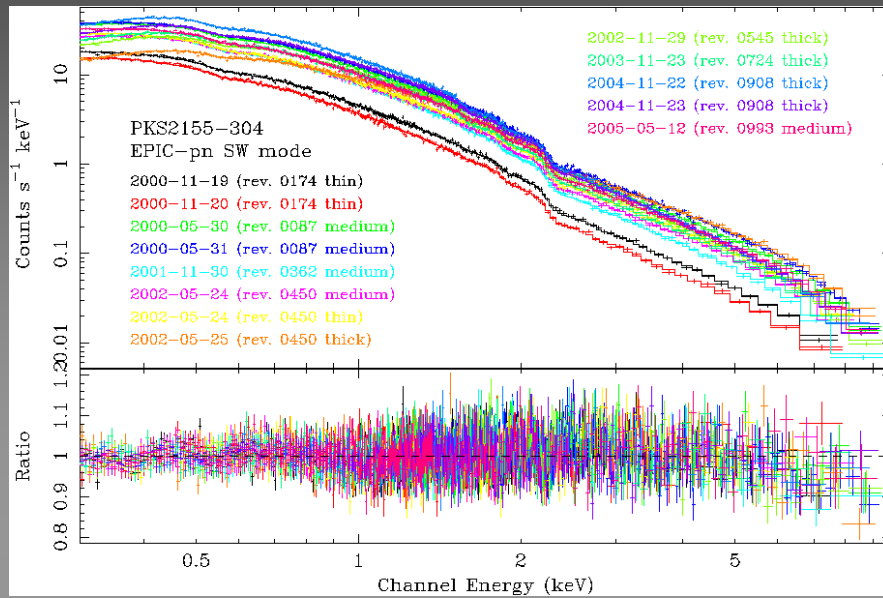


Frank Haberl

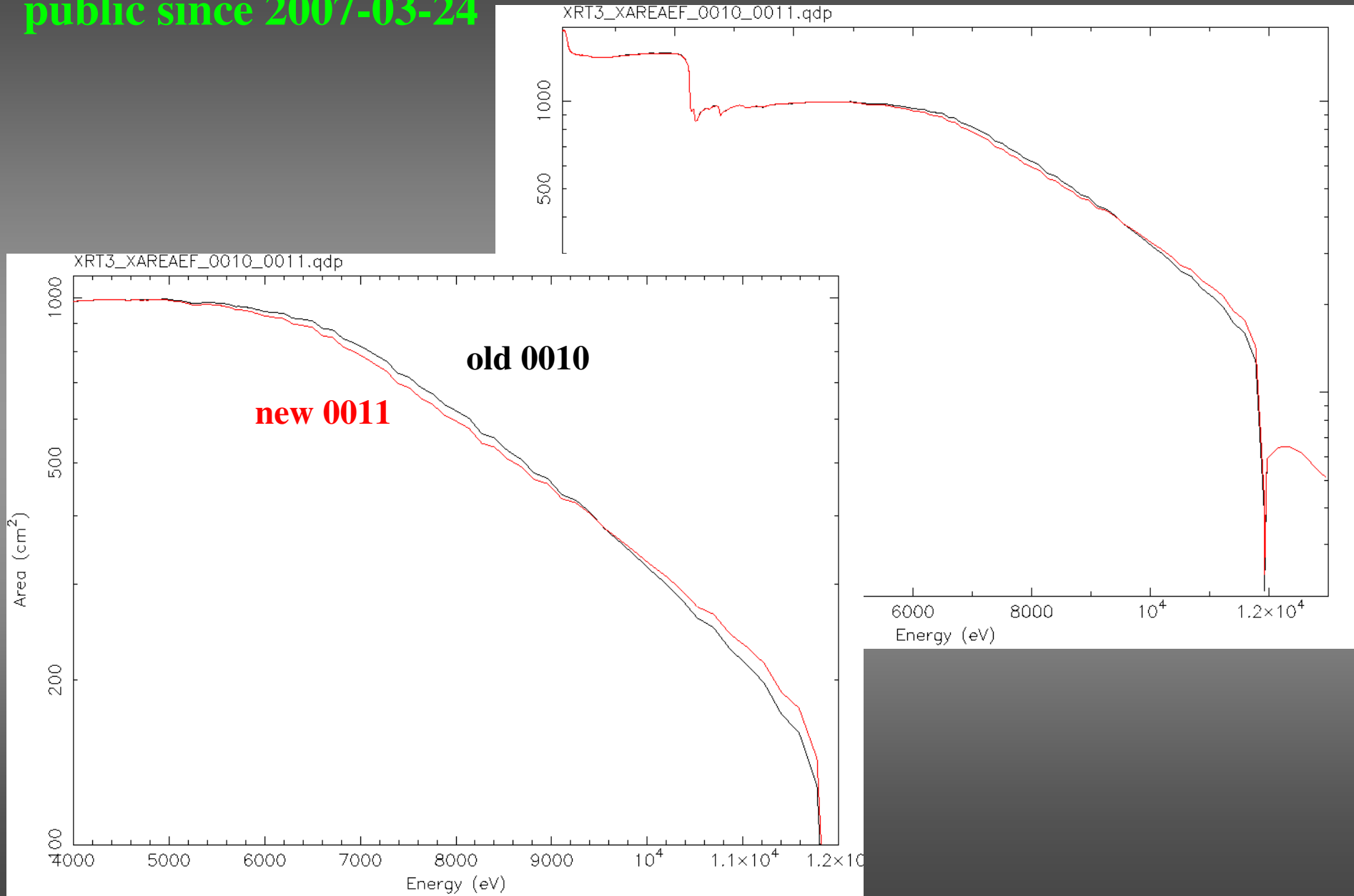
EPIC cal meeting, Palermo, 12-13 April 2007



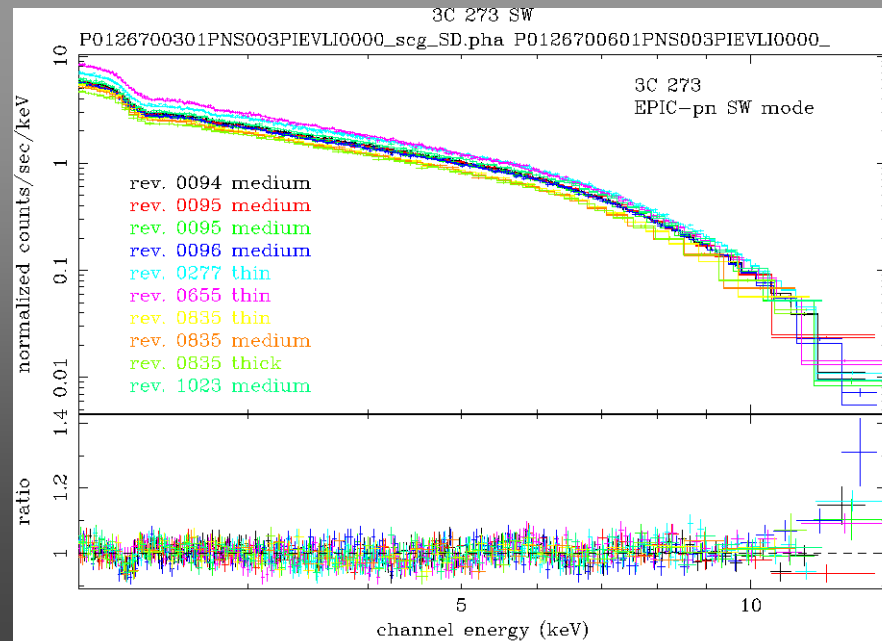
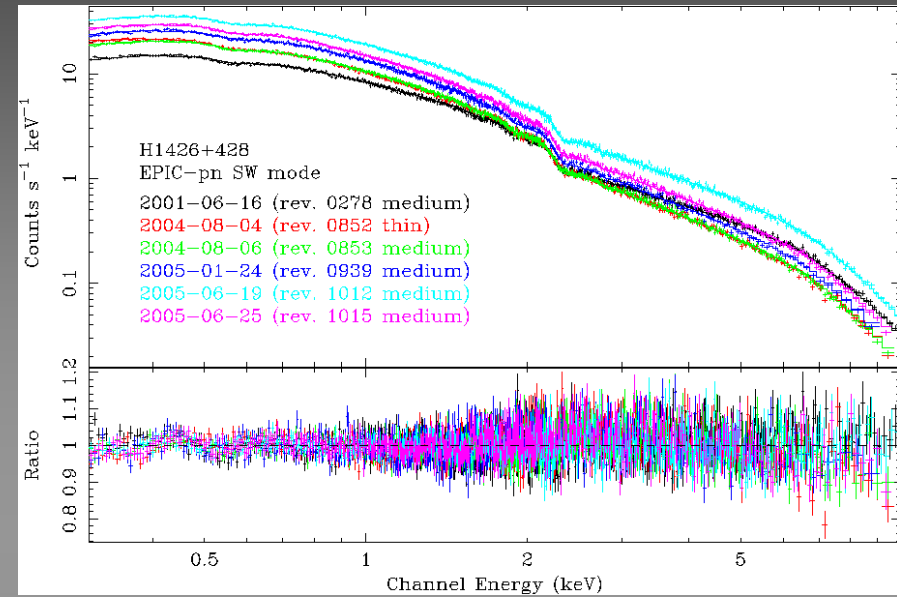
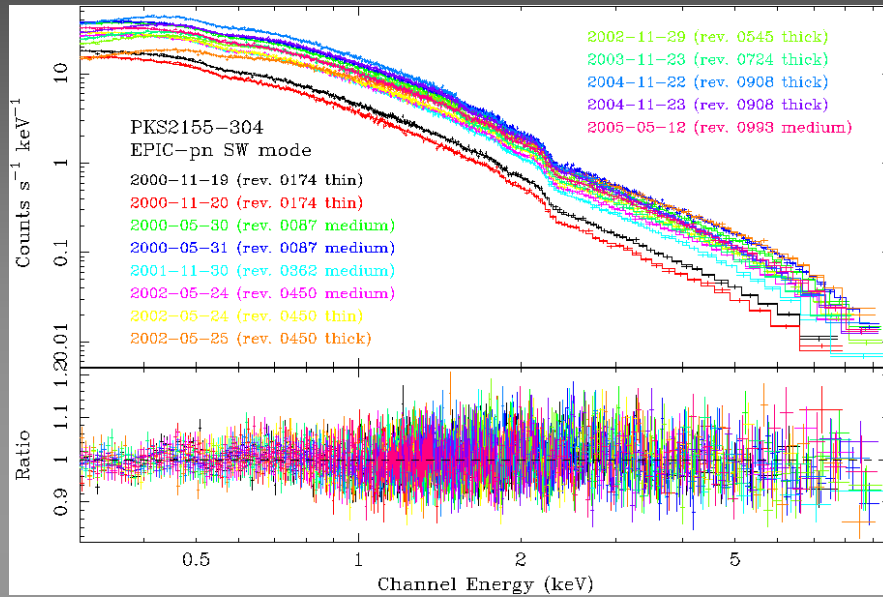
SAS 7.0.0 + XRT3_XAREA_0010.CCF



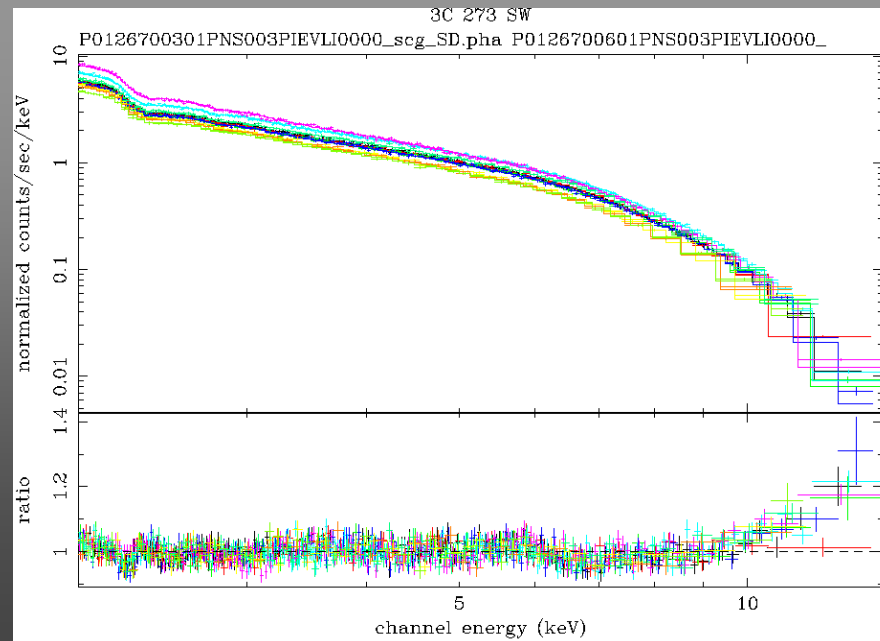
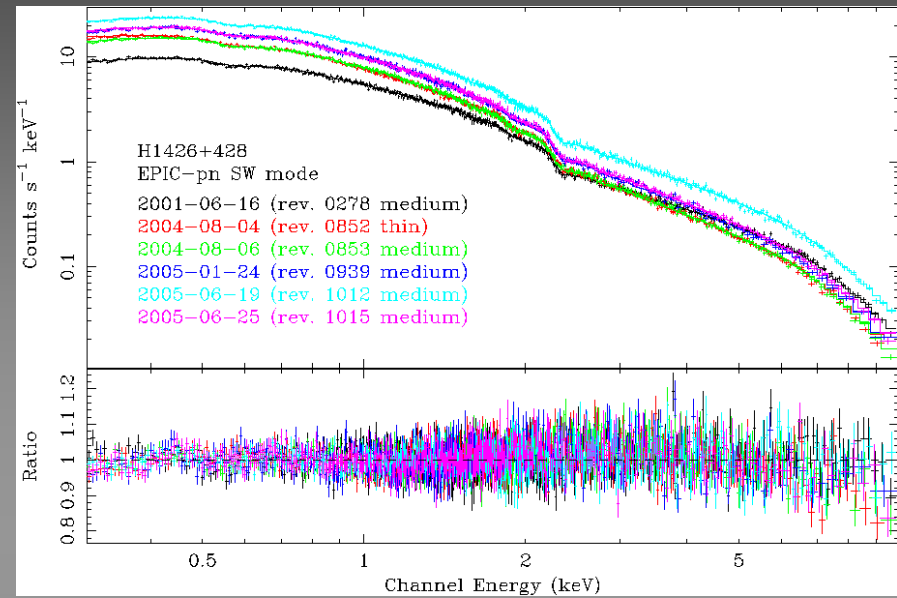
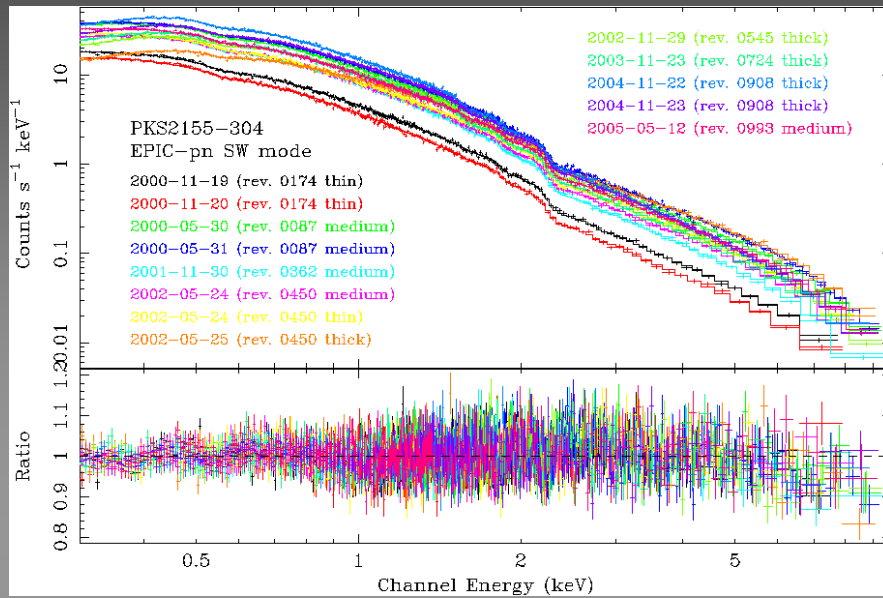
Modified mirror areas XRT3_XAREA_0011.CCF public since 2007-03-24



SAS 7.0.0 + XRT3_XAREA_0011.CCF



SAS 7.0.0 + XRT3_XAREA_0010.CCF



Comparison XRT3_XAREA_00xx.CCF

10

11

Spectra	χ^2	χ^2 red	χ^2	χ^2 red	dof	
3C273 SW	4748	1.202	4592	1.163	3950	
H1426+428 SW	4196	1.262	3986	1.199	3325	
PKS2155 SW	5193	1.159	5097	1.137	4520	ring
PKS2155 TI	1650	1.313	1511	1.202	1257	

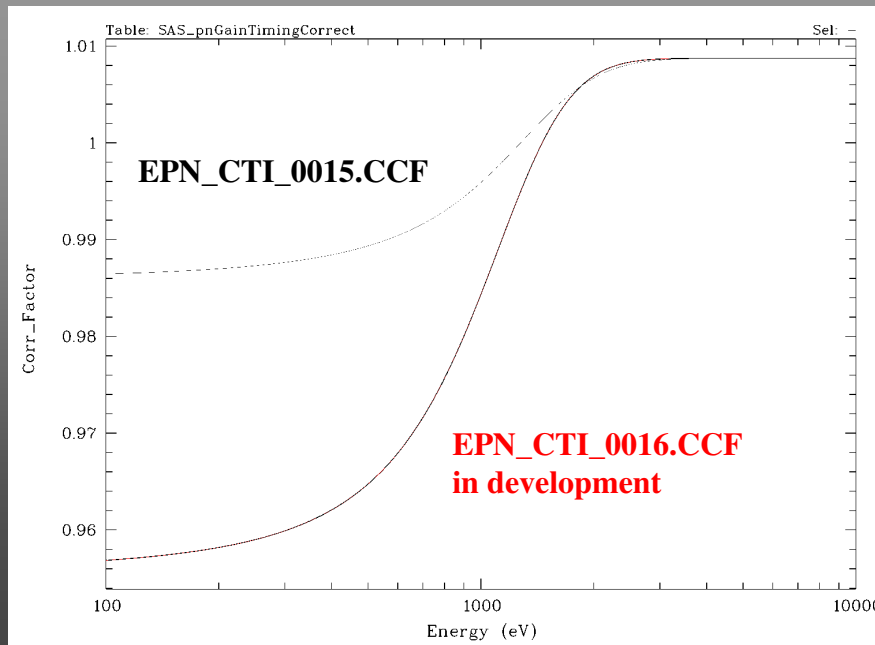
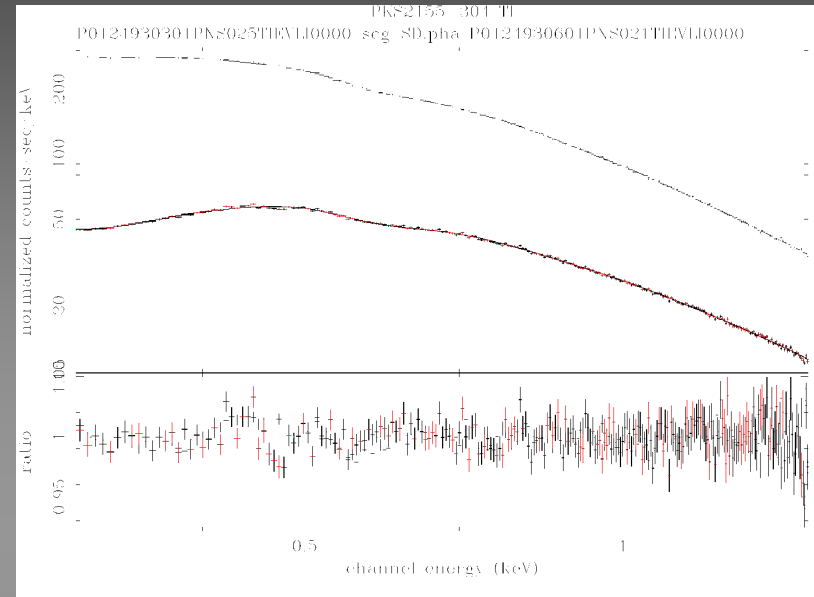
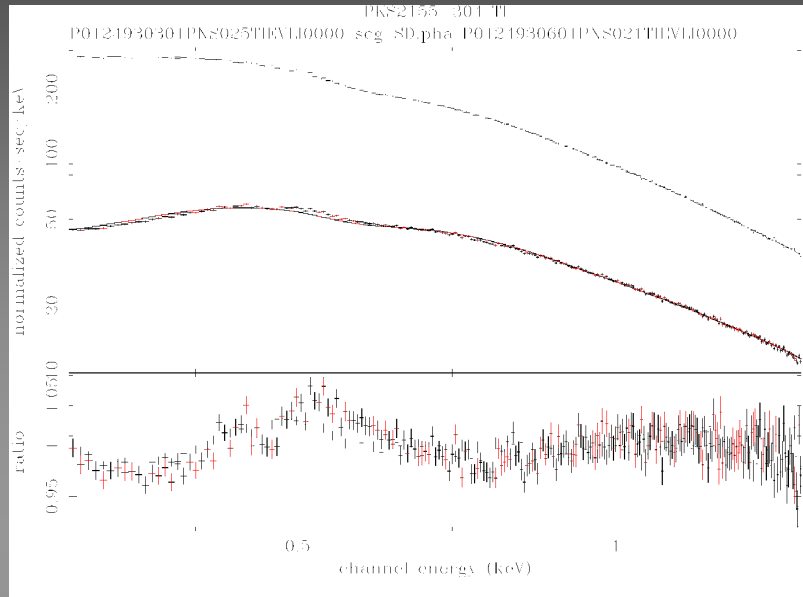
Powerlaw index:

3C273 SW 1.6187 1.5842 1.5928 1.5940 1.5974 1.7665 1.6839 1.7030 1.6817 1.5836
 1.6157 1.5822 1.5900 1.5940 1.5950 1.7647 1.6804 1.6986 1.6919 1.5689

H1426+428 SW 1.7978 2.1650 2.1871 2.2010 2.0054 2.1531
 1.7938 2.1589 2.1799 2.1941 1.9997 2.1457

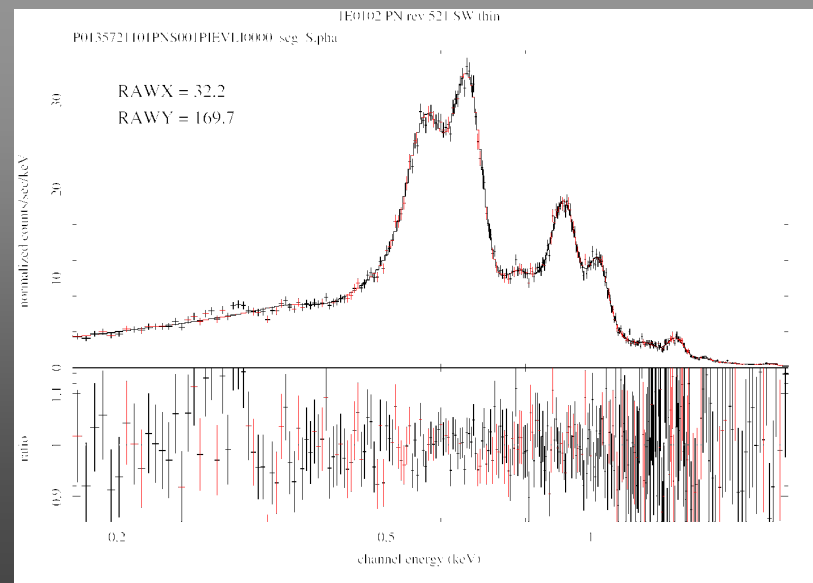
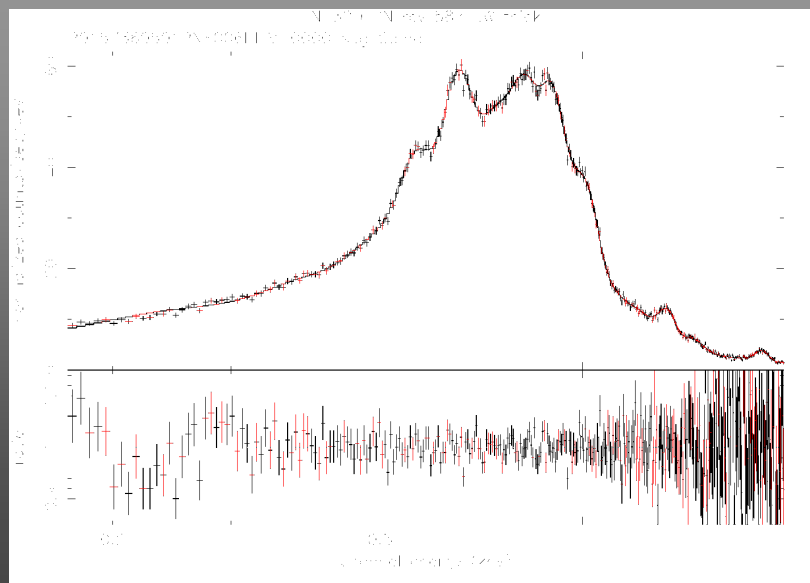
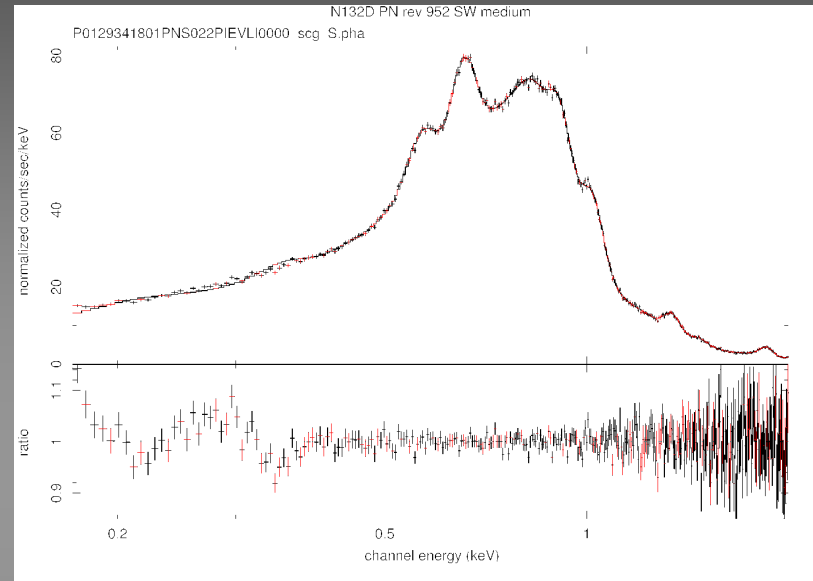
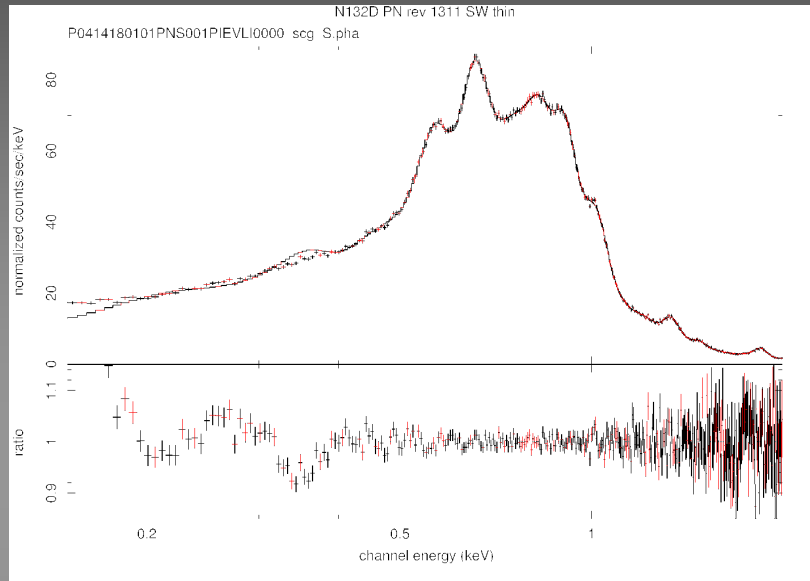
Index decreases (spectra become harder) by 0.003-0.007

Timing mode – Gain/CTI correction

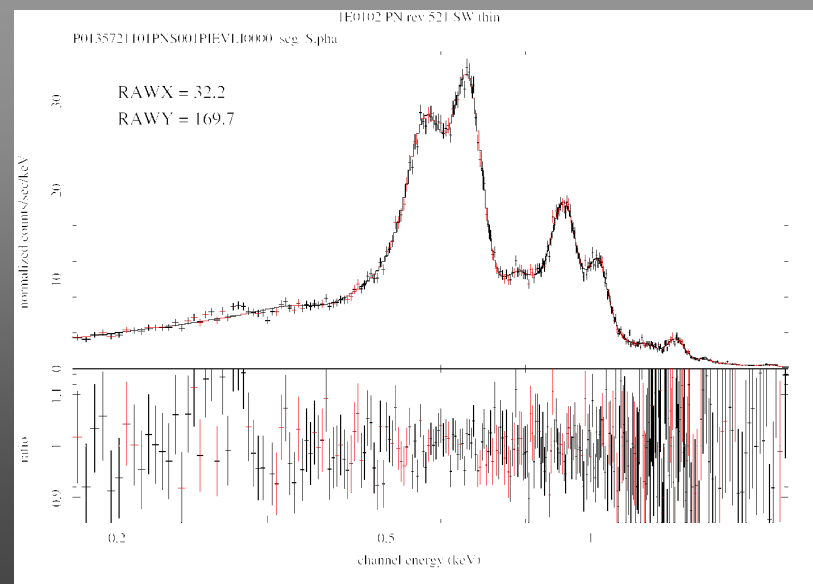
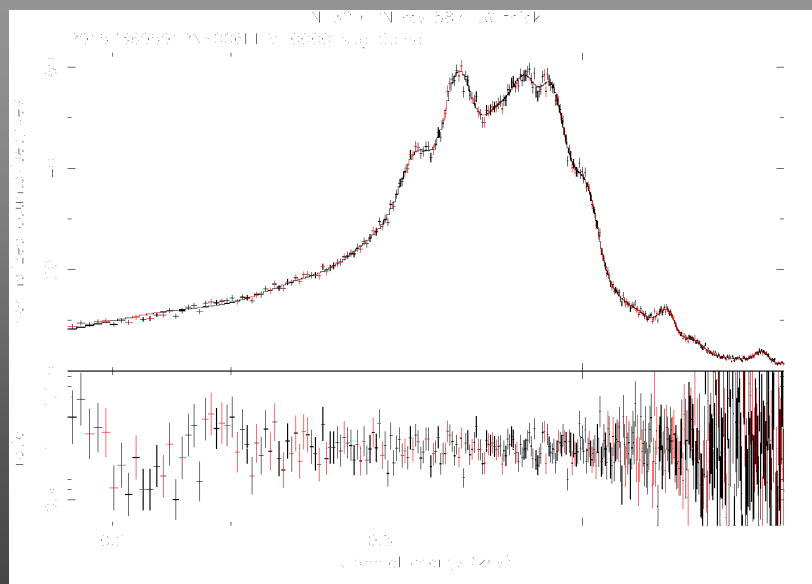
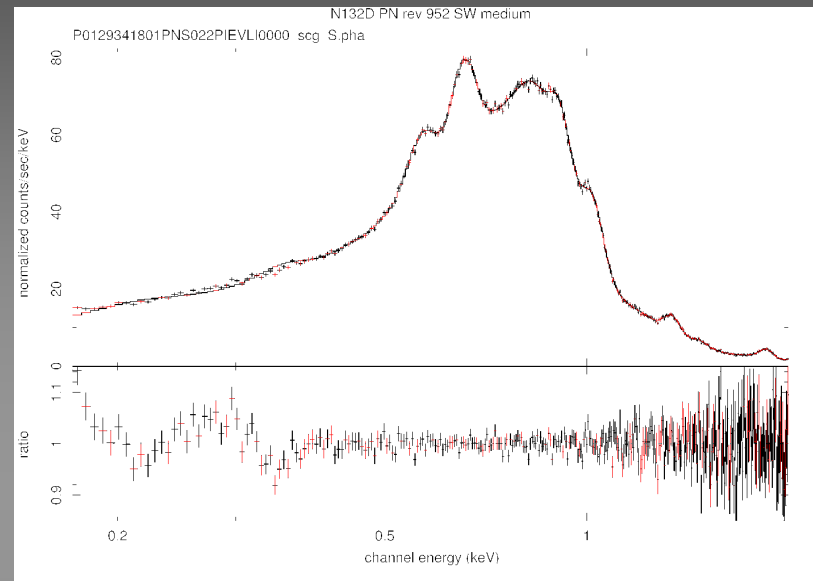
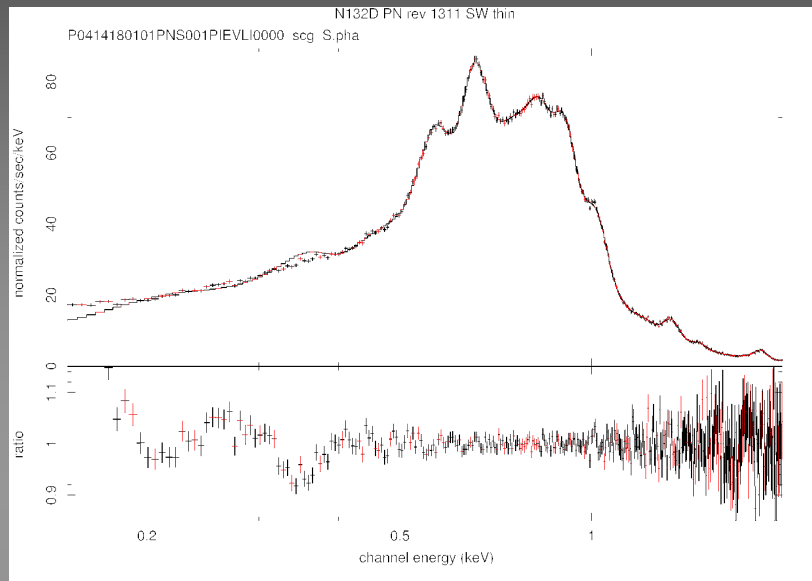


Re-distribution

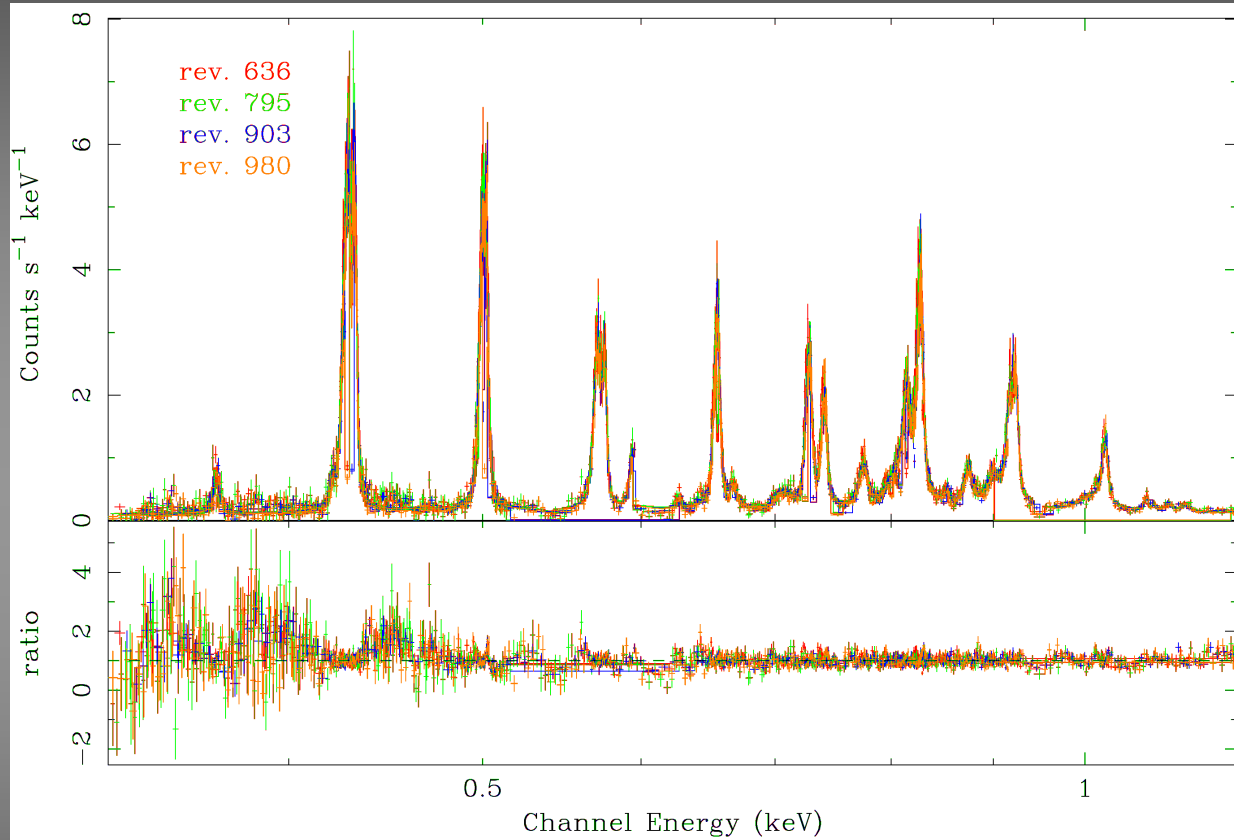
A Problem around 370 eV



Re-distribution: A Problem around 370 eV



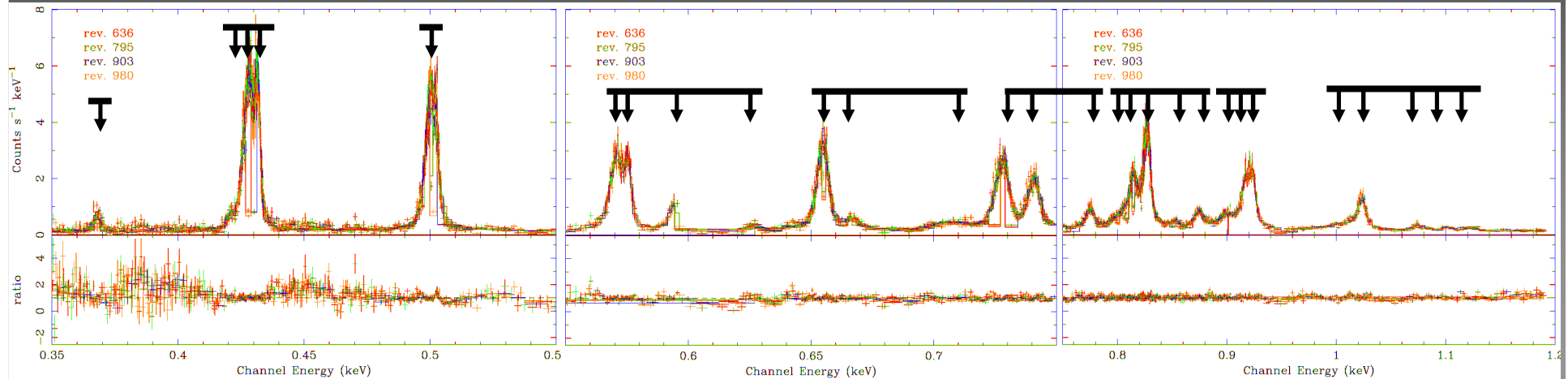
Re-distribution: Model spectrum for Zeta Puppis



RGS 1/2
Continuum from EPIC-pn
powerlaw
28 Gaussians

Concept:
Apply RGS model to pn spectra.
Allow some degrees of freedom
and fit to pn.
Re-apply the new model to RGS.
Investigate the discrepancies.

Re-distribution: Model spectrum for Zeta Puppis



RGS model for EPIC-pn:

Fix all line widths

For line-complexes which are unresolved in pn:

- Fix line energies relative to each other

- Fix line intensity ratios

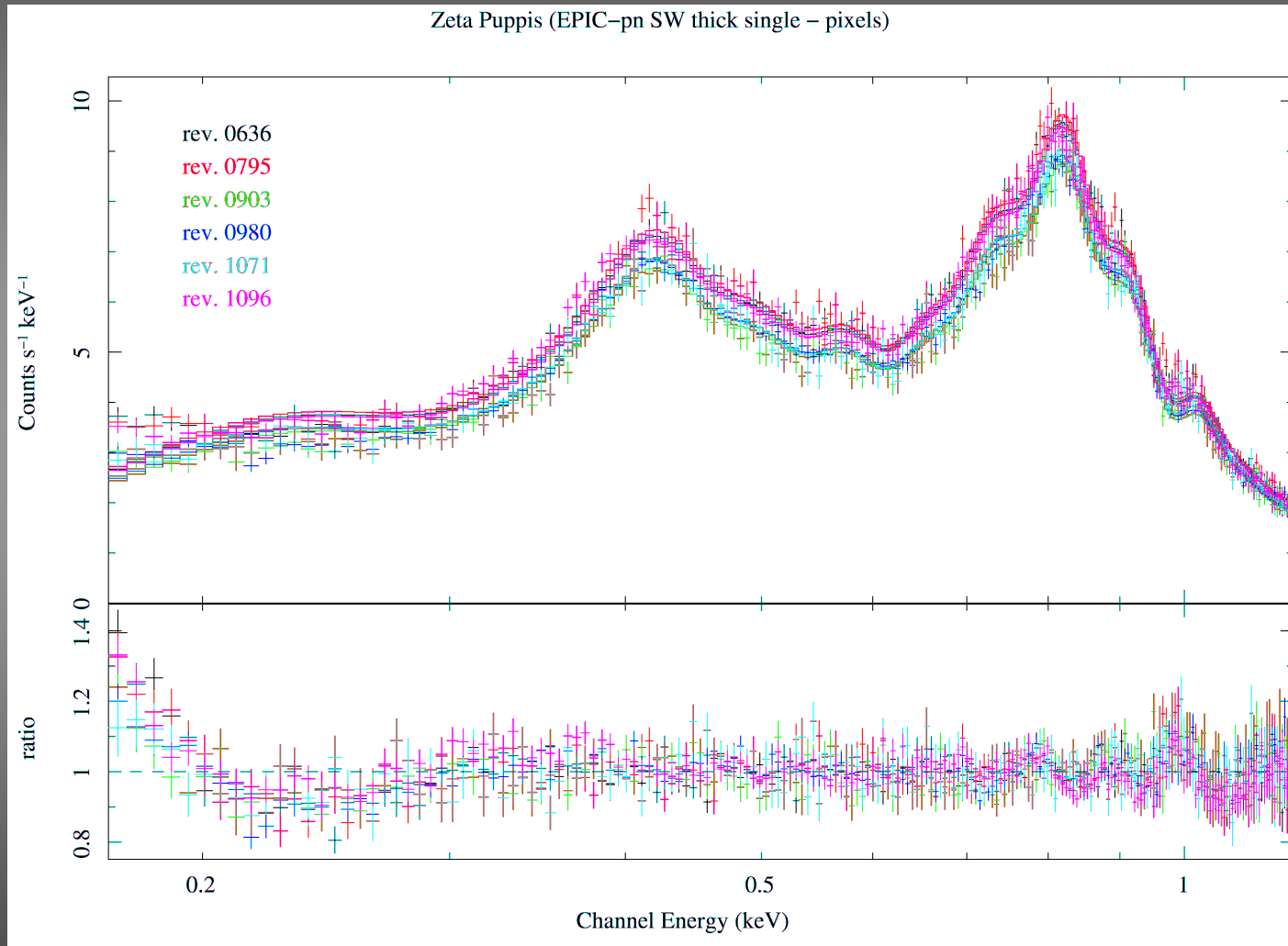
For each line complex: 1 free energy and 1 free normalization

Improvements: add some weak lines

- combine more lines

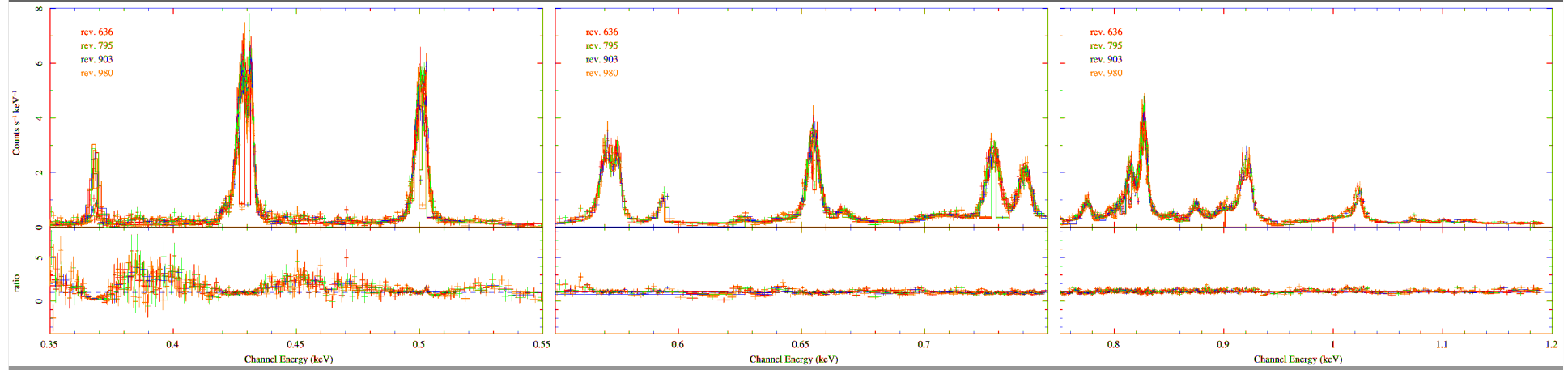
- iterate continuum

Re-distribution: Zeta Puppis



Fit of RGS model to pn
All line energies fixed
Free normalizations
(one per line complex)

Re-distribution: Zeta Puppis



Re-application of model to RGS: Fit of overall normalization factor

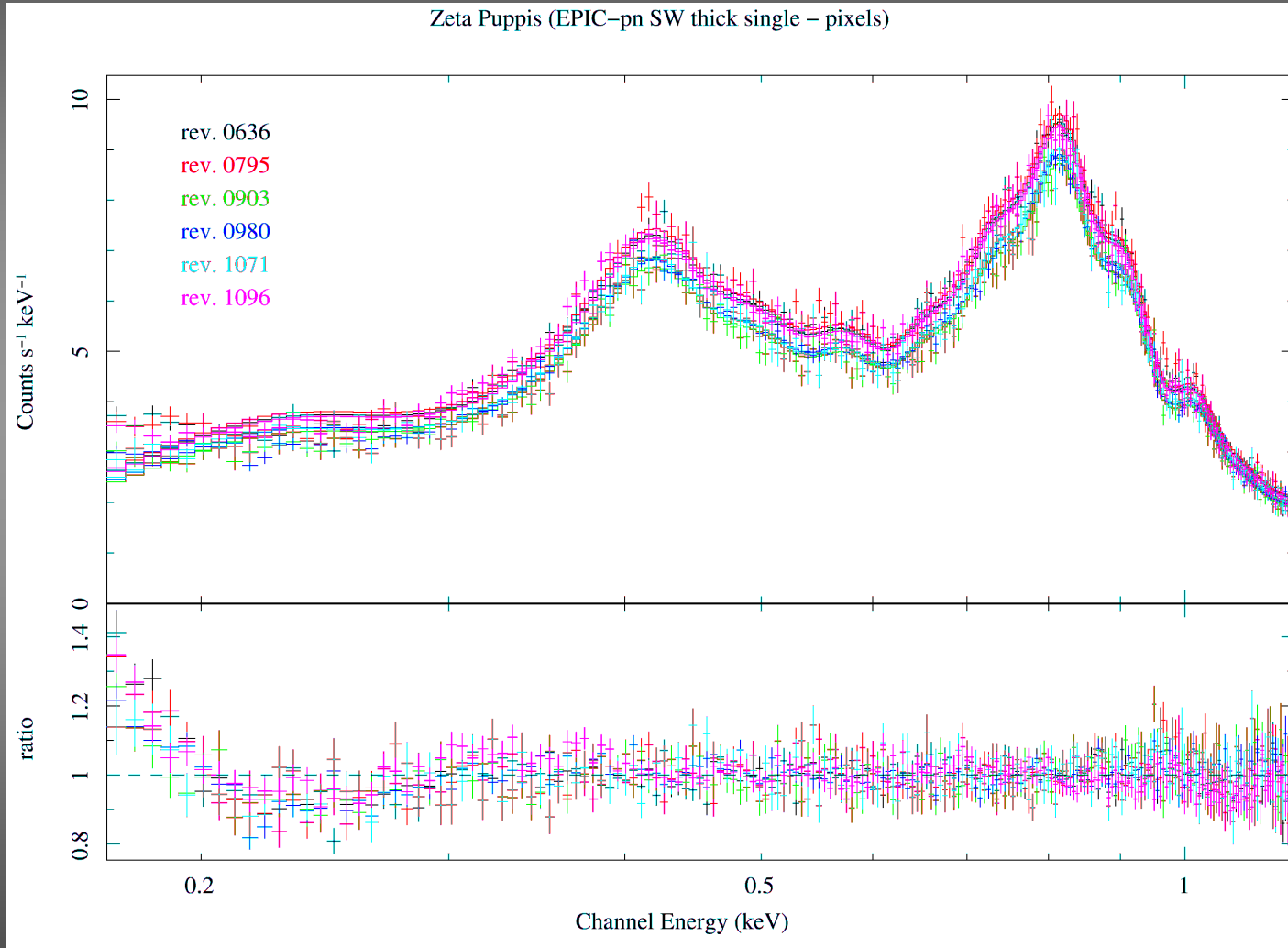
Discrepancies:

Lines above 800 eV are stronger in RGS spectra

Residuals in the pn spectra above 800 eV

The C VI line at 367.6 eV is much stronger in pn spectra

Re-distribution: Zeta Puppis



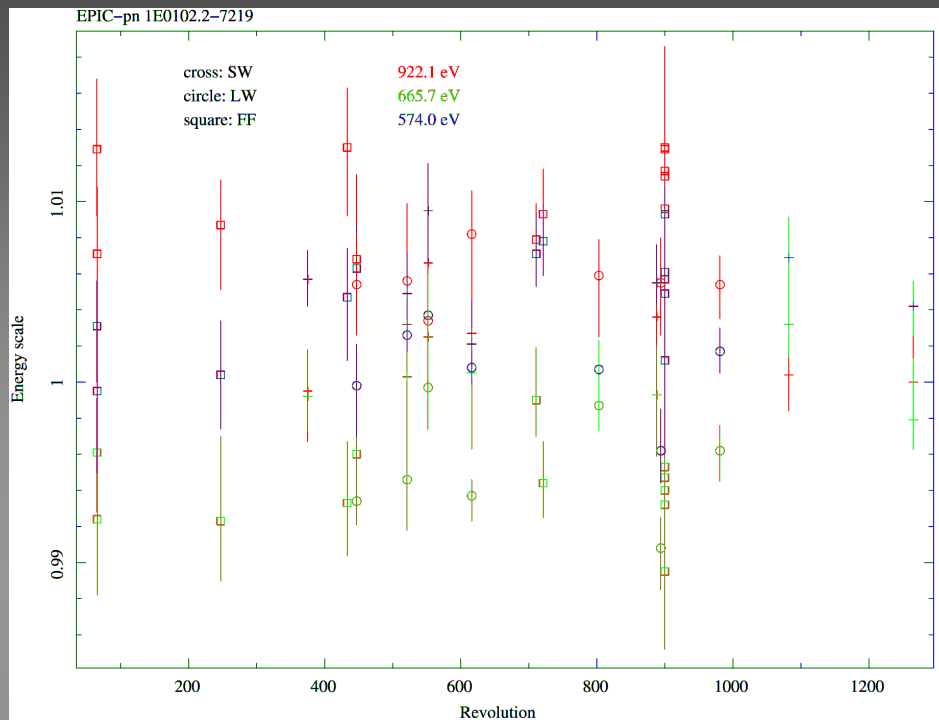
Free line energies for
the 3 line complexes
above 800 eV

RGS	pn	
810.1	806.0	eV
900.7	894.6	eV
1000.6	996.4	eV

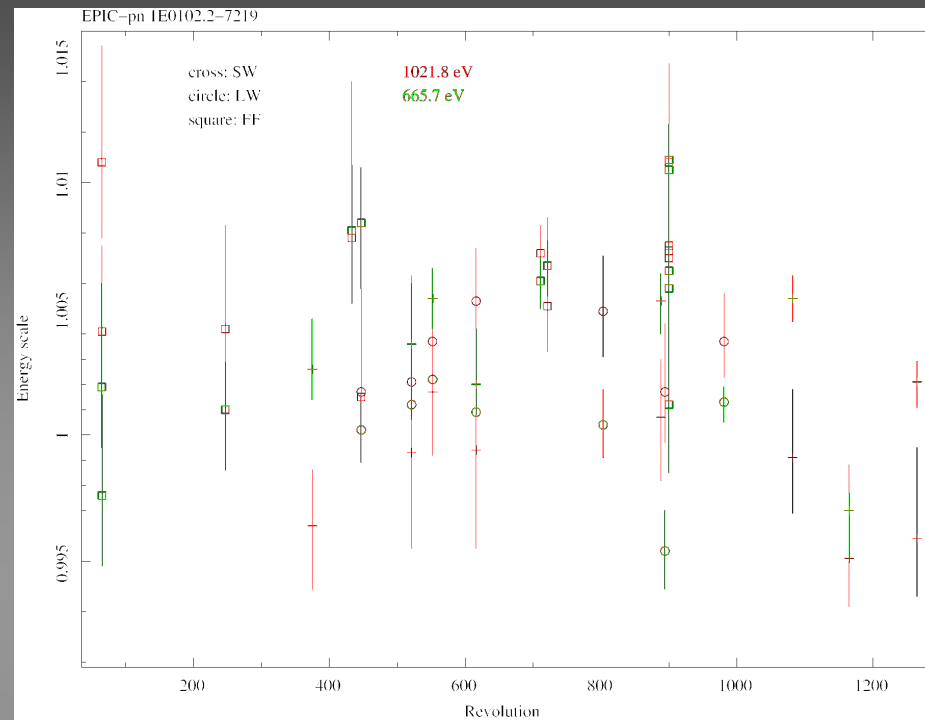
about -5 eV shift for pn

A SW mode problem?

Small Window mode 1E0102



3 Line complexes (2 O, 1 Ne)



2 Line complexes (1 O, 1 Ne with more lines)

Summary:

More lines need to be linked together for pn

SW mode needs slight energy correction at 800-1100 eV

Re-distribution problem below 500 eV