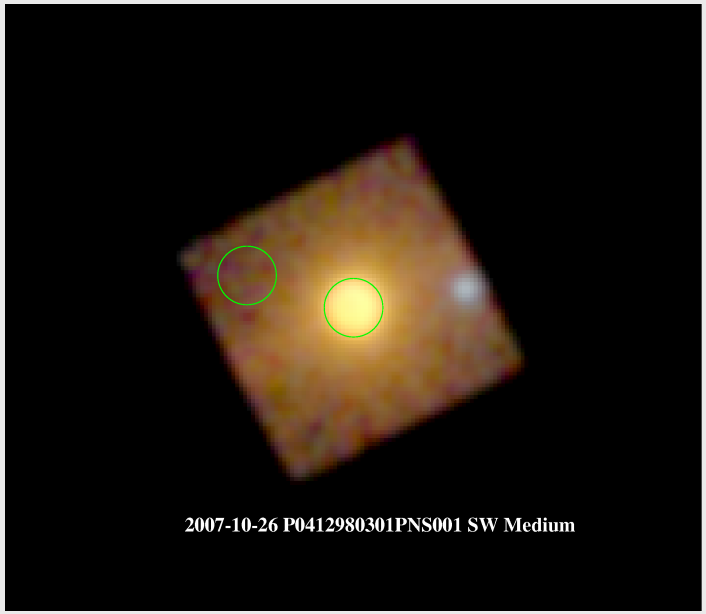
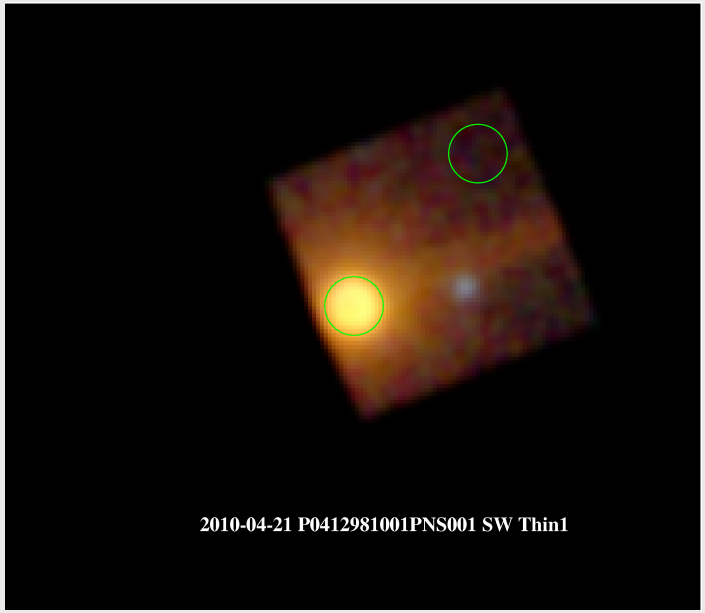
EPIC-pn Small-Window mode spectra of 1E0102-7219
Line normalisations latest news (SAS11)

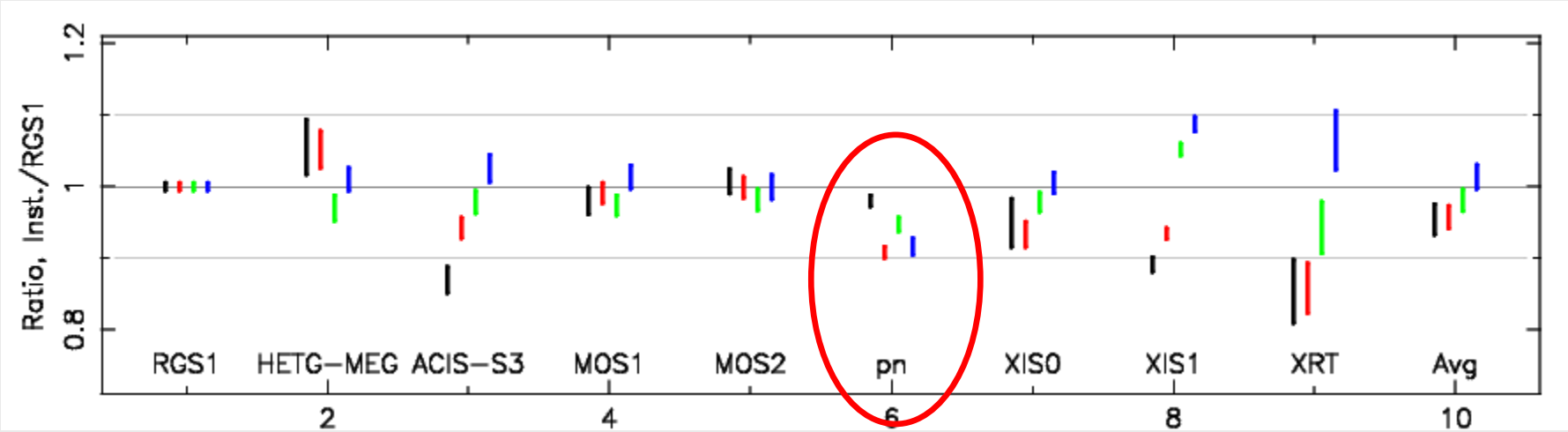




Frank Haberl

EPIC calibration workshop, Leicester, 2012 March 6-8

SPIE paper



Plucinsky et al. 2008, SPIE, 7011, 68

- **pn values from single observation (0412980301, 2007-10-26)**
- **30” extraction radius**
- **SAS 7.1**
- **energy dependence shows opposite trend in comparison to most other instruments**

SW-mode observations

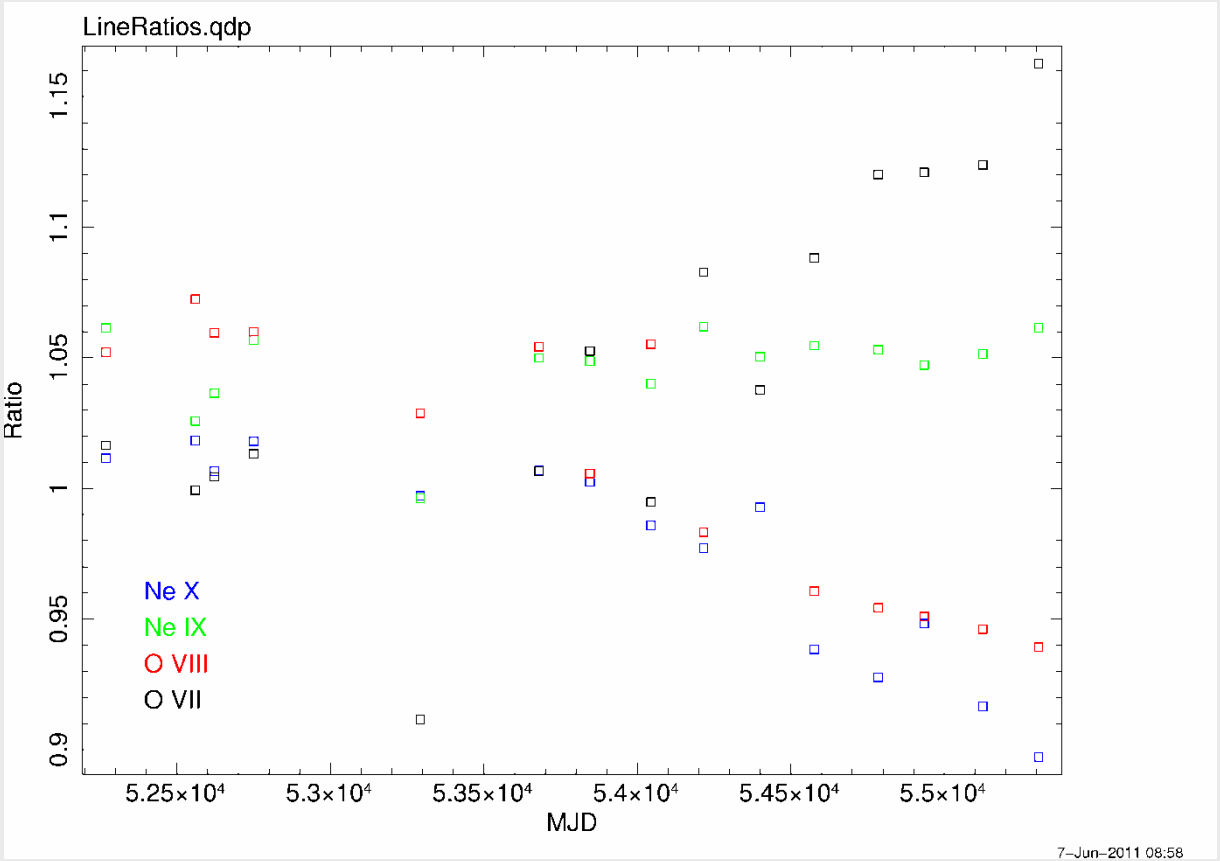
- **2001-12-25 to 2011-04-20 (Rev. 375 to 2081)**
- **9 x thin; 6 x medium, 1 x thick**
- **single-pixel events**
- **8 x at window centre; 8 x at nominal focus position**
  - extraction 75” radius; extraction 30” radius
  - arf for point source
  - average normalisation 1.0315 (75”) to 1.0 (30”)

model rgspn_mod_tbabs_tbvarabs_2apec_line_ratios_jd_v1.9.xcm

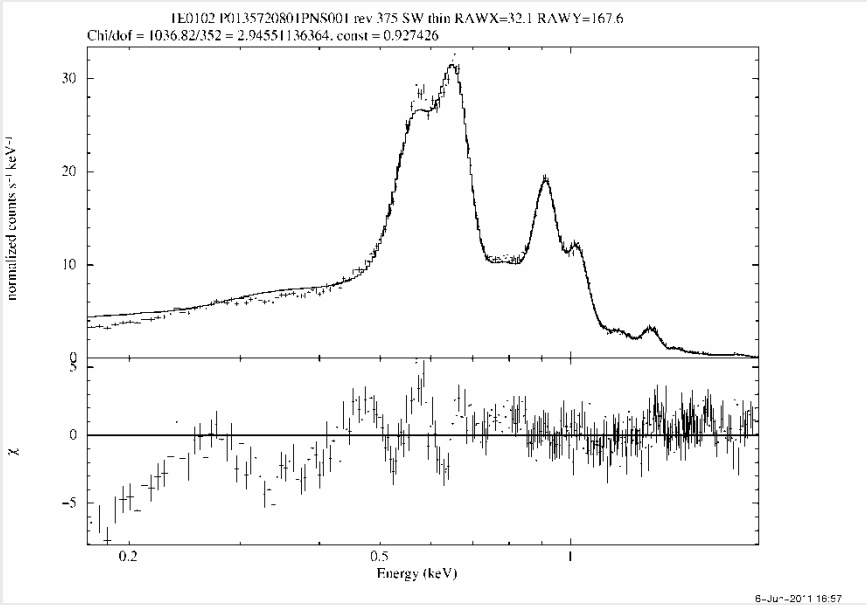
30'' spectra – no gain correction

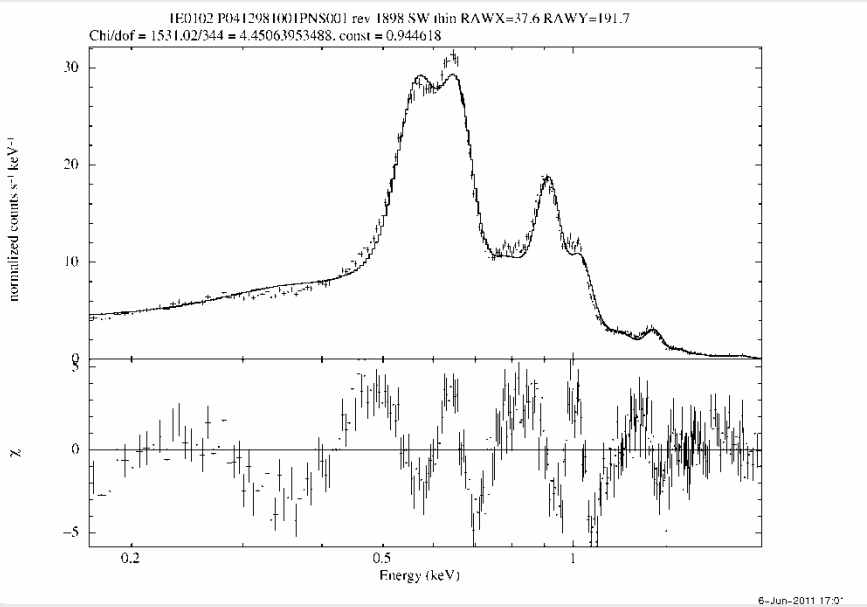
Fit with 5 free parameters: overall norm, 4 line norms

4 ratios: overall norm * line norm / model line norm



30'' spectra – no gain correction

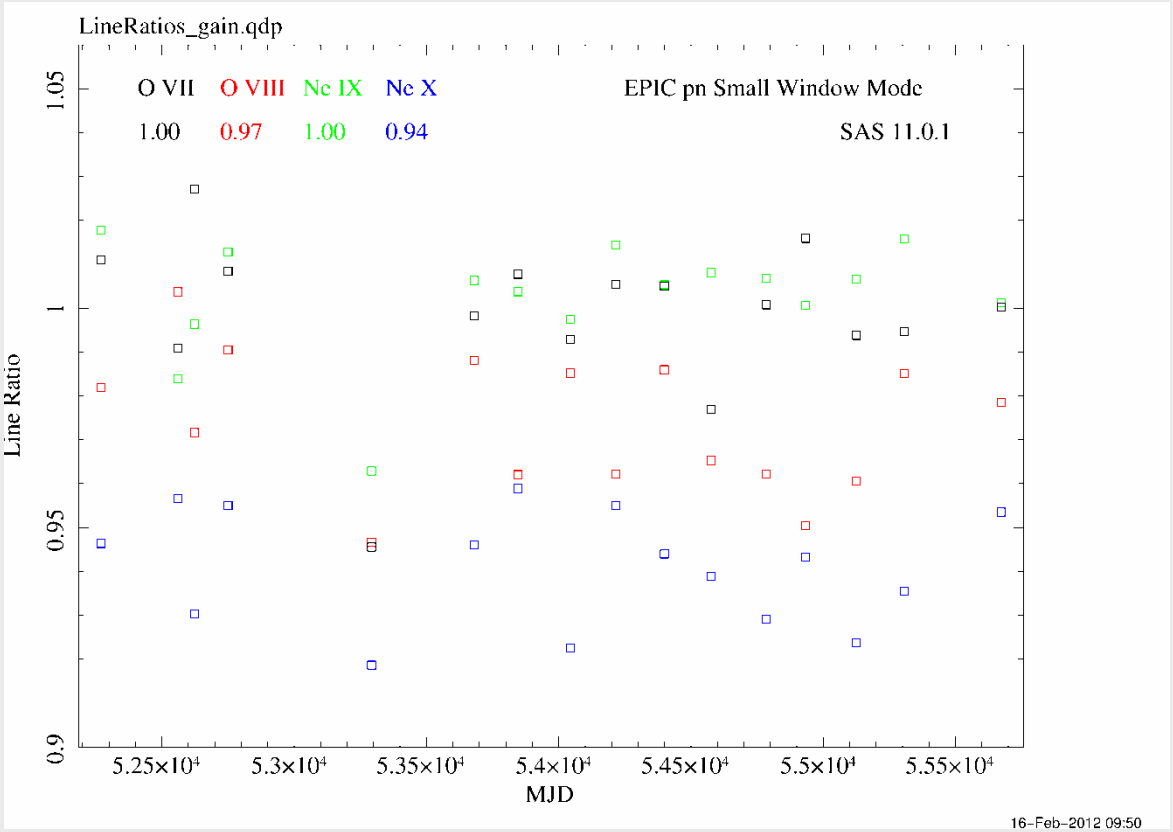




shift in energy scale ⟶ gain fit necessary

Line normalisations

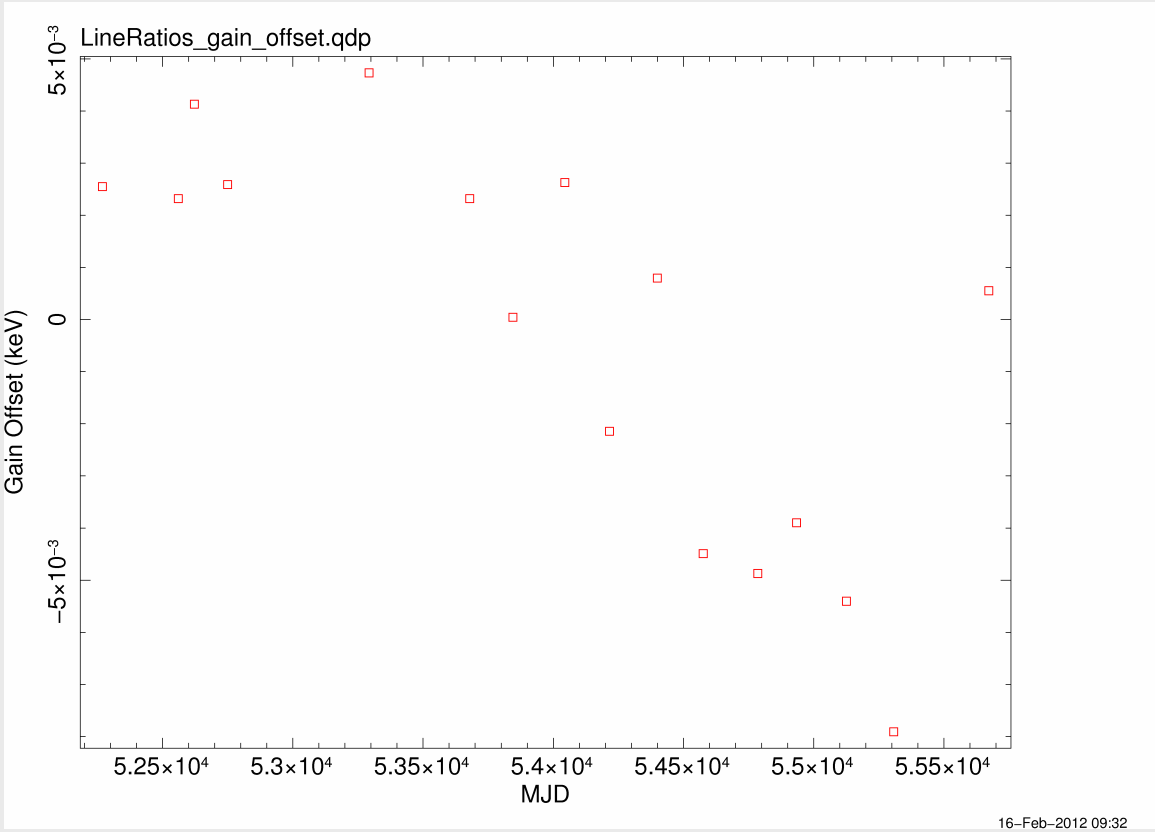
Fit with 6 free parameters: overall norm, 4 line norms, gain shift



includes EEF correction 30” to 75” of 1.0315

30'' spectra – gain shift

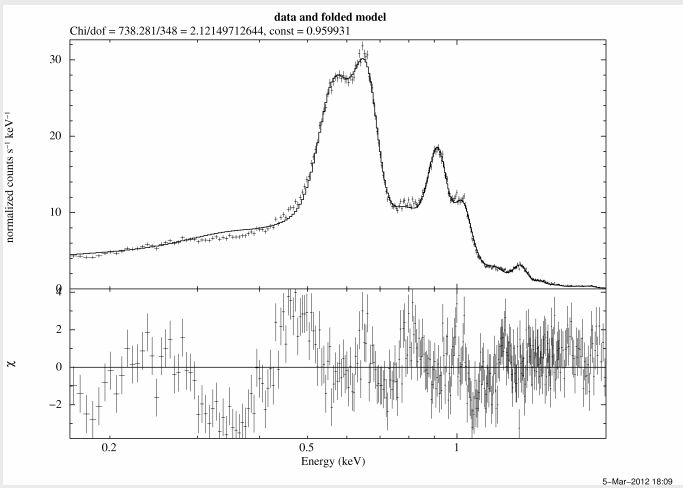
gain shift (offset fitted with xspec)

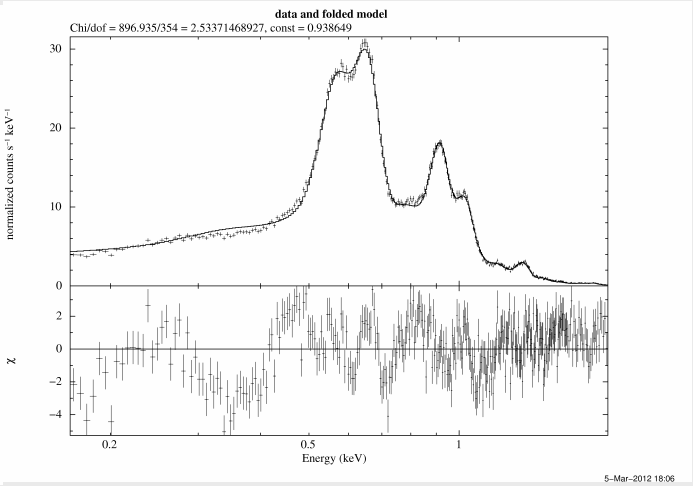


The PI values in the event file

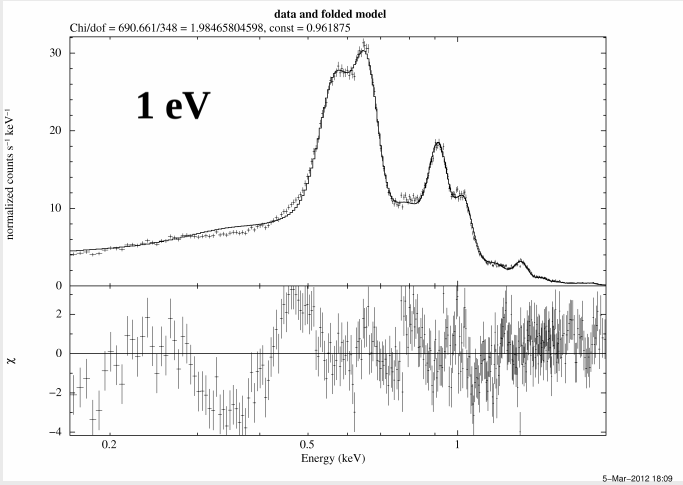
PI values in event file with 1eV accuracy
little shift required !

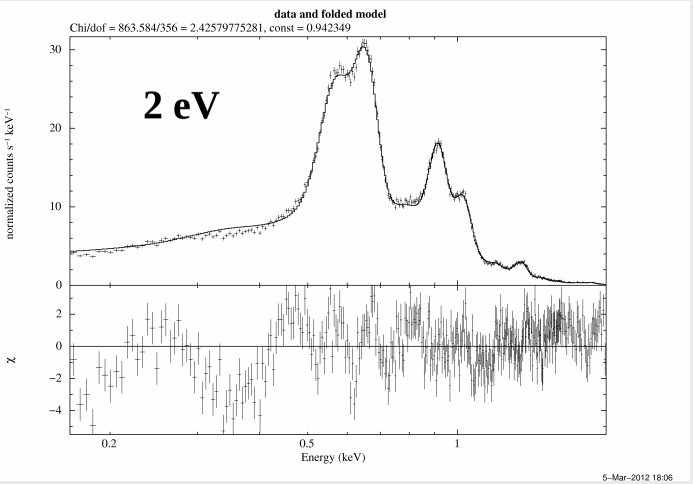
No shift





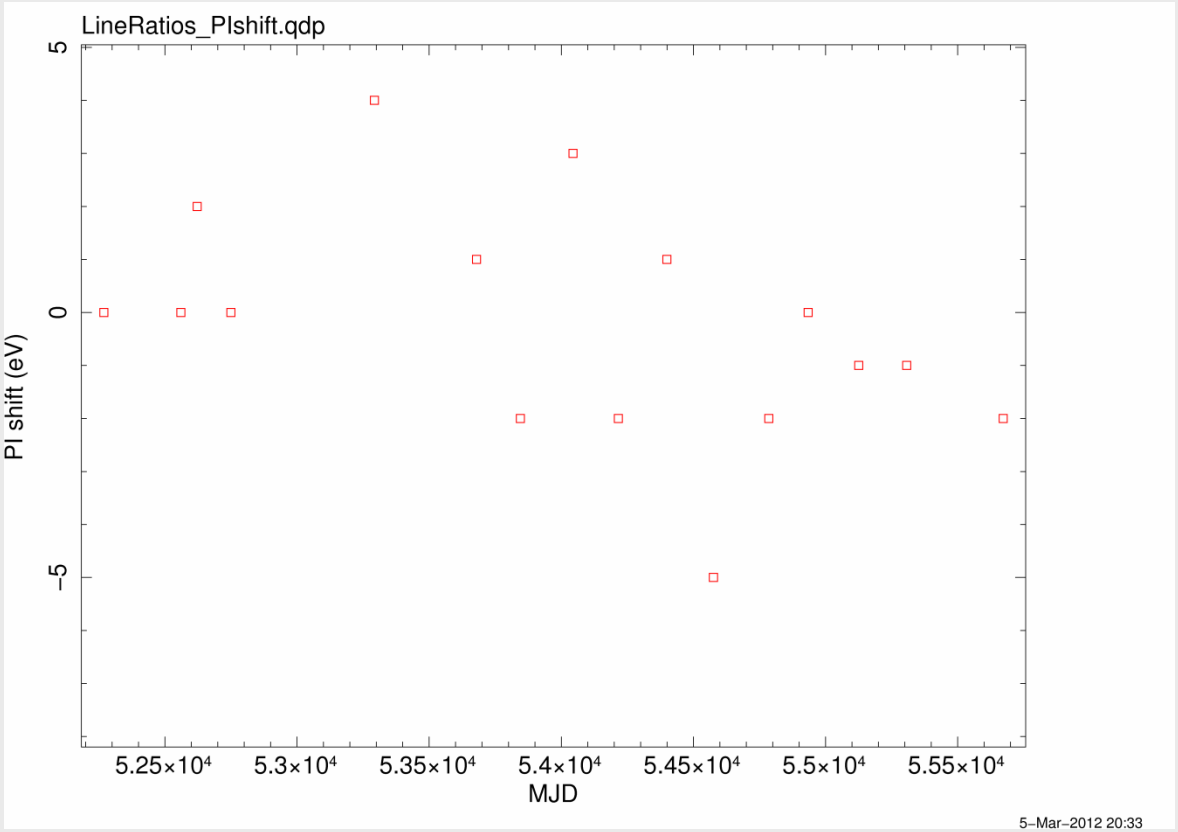
Best shift





Best-shift spectra

PI shift (applied to PI values in event file)



Conclusions

- **EPIC-pn needs gain fitting**
- **Line ratios for O VII, O VIII and Ne IX are consitent**
- **Line ratios for Ne X are about 5% lower**
- **Line ratios are stable on long-term**
- **Future improvements:**
  - **Iteration on energy resolution?**
    limited by partial event model
  - **CTI calibration below 1 keV**
    but contradicted by rev 2081 observation?
  - **Ne X ? (is not far away from Ne IX)**
    model problem?
  - **An excess around 800 eV**
    seen by other instruments?
- **PI values in event file with 1eV accuracy**
  - **reduce required gain correction**
  - **improve fit quality**
  - **after testing switch the default for epchain**