

EPIC-pn Large Window Mode fast-shift CTI correction

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- EPIC-pn window modes: CTI correction (FM1 @ Panter)
- Non-routine calibration observation (N132D, with FS @ XMM)
- Results

EPIC-pn: FF + LW modes: readout (N132D)

N132D

0909_0210681301_PNS001

Singles, 0.50 – 2.00 keV

Mode = PrimeFullWindow Filter = Medium
 $\alpha_{2000} = 05\ 24\ 57.5$ $\delta_{2000} = -69\ 37\ 29.5$ PA = 163.674°
 $l = 280.287^\circ$ $b = -32.794^\circ$ $N_{H,gal} = 6.22 \times 10^{20} \text{ cm}^{-2}$

2004-11-25T07:34:10

2004-11-25T12:58:41

19471 s

N132D

0909_0210681401_PNS001

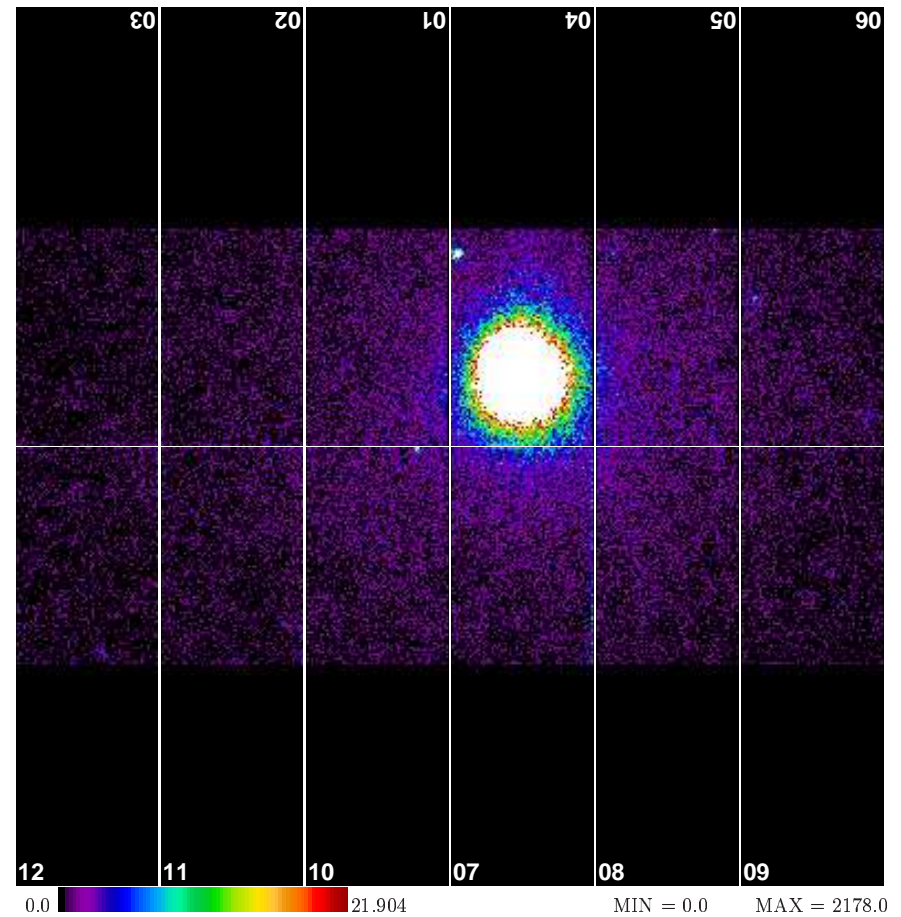
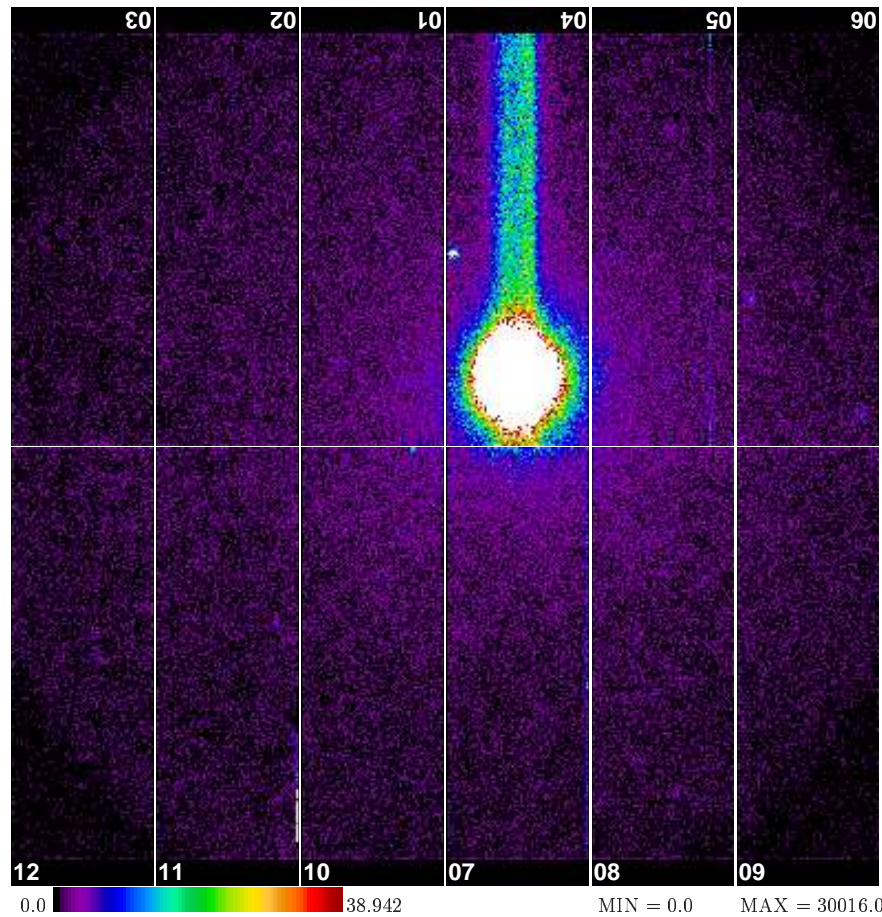
Singles, 0.50 – 2.00 keV

Mode = PrimeLargeWindow Filter = Medium
 $\alpha_{2000} = 05\ 24\ 57.5$ $\delta_{2000} = -69\ 37\ 29.2$ PA = 163.67°
 $l = 280.287^\circ$ $b = -32.794^\circ$ $N_{H,gal} = 6.22 \times 10^{20} \text{ cm}^{-2}$

2004-11-25T19:36:28

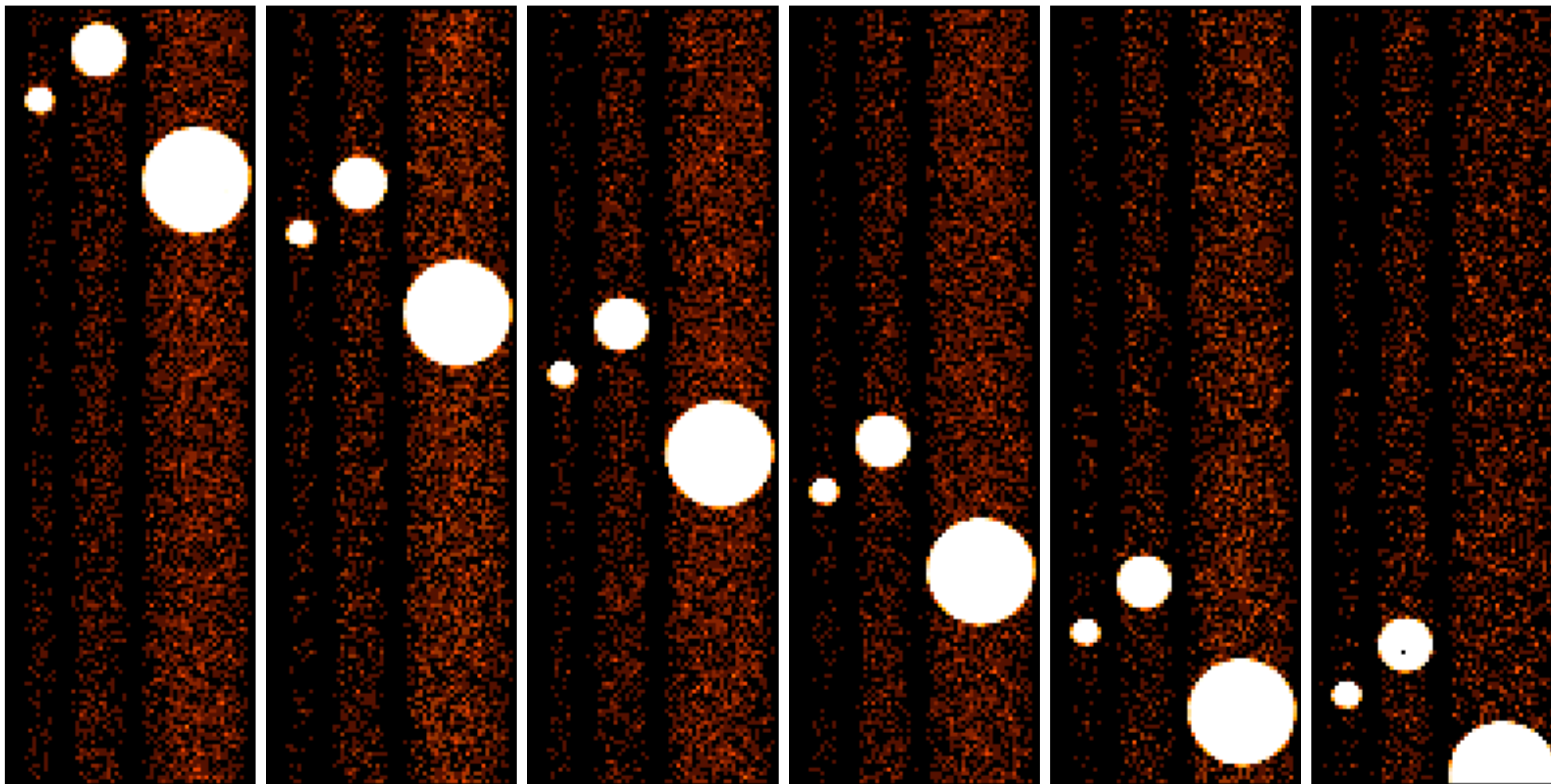
2004-11-25T22:39:00

10952 s



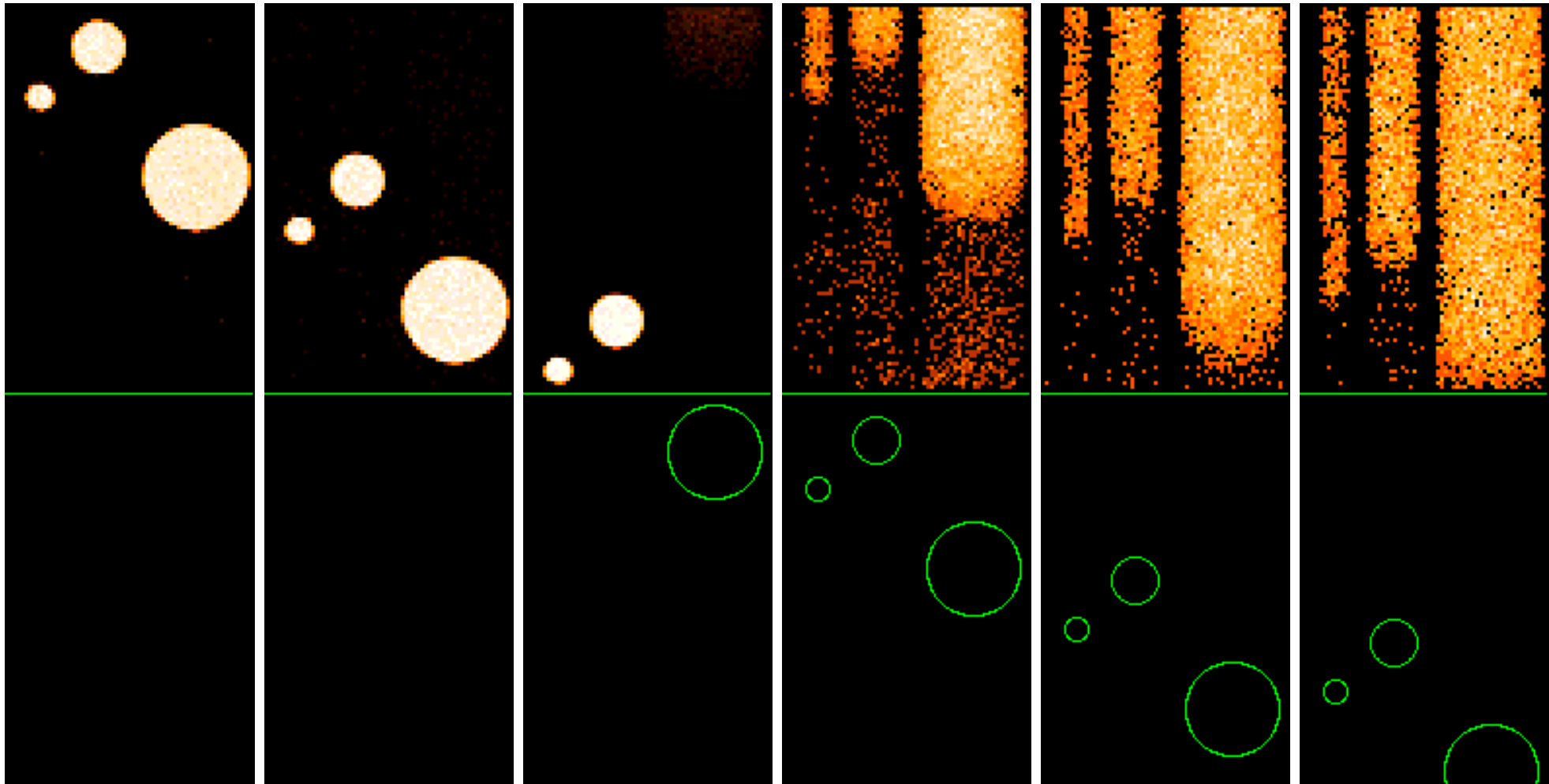
different integration, shift/readout: different CTI effects

EPIC-pn: pinhole measurements: FF mode



readout toward bottom: mask with 3 pinholes, camera moved behind

EPIC-pn: pinhole measurements: LW mode

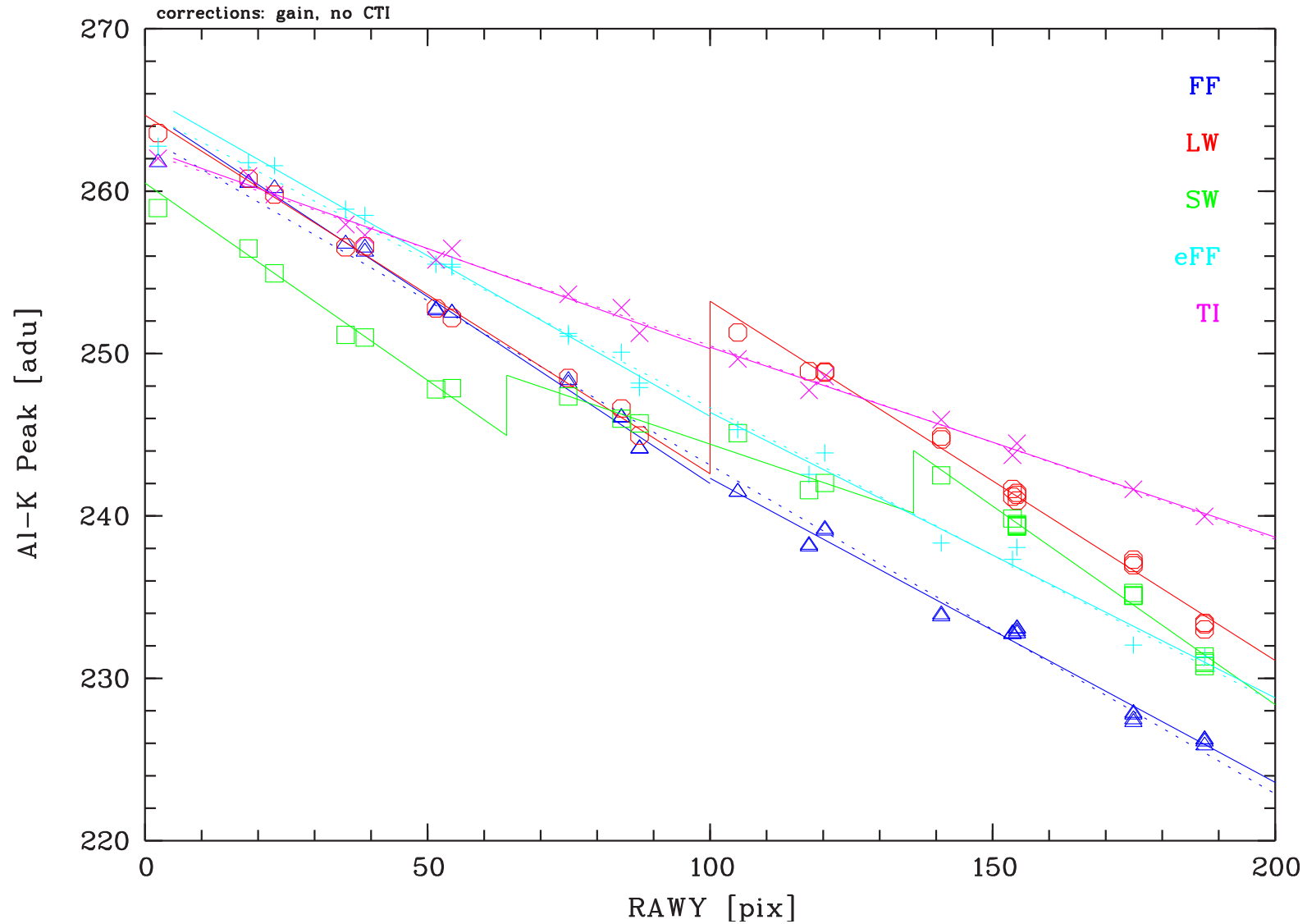


readout toward bottom: mask with 3 pinholes, camera moved behind

circles indicate positions above detector

compare line positions FF/LW along readout direction

Pinhole measurements: all modes, Al-K



FF/LW : step of (raw) amplitudes at RAWY = 100

EPIC-pn CTI jumps for FM1: adu

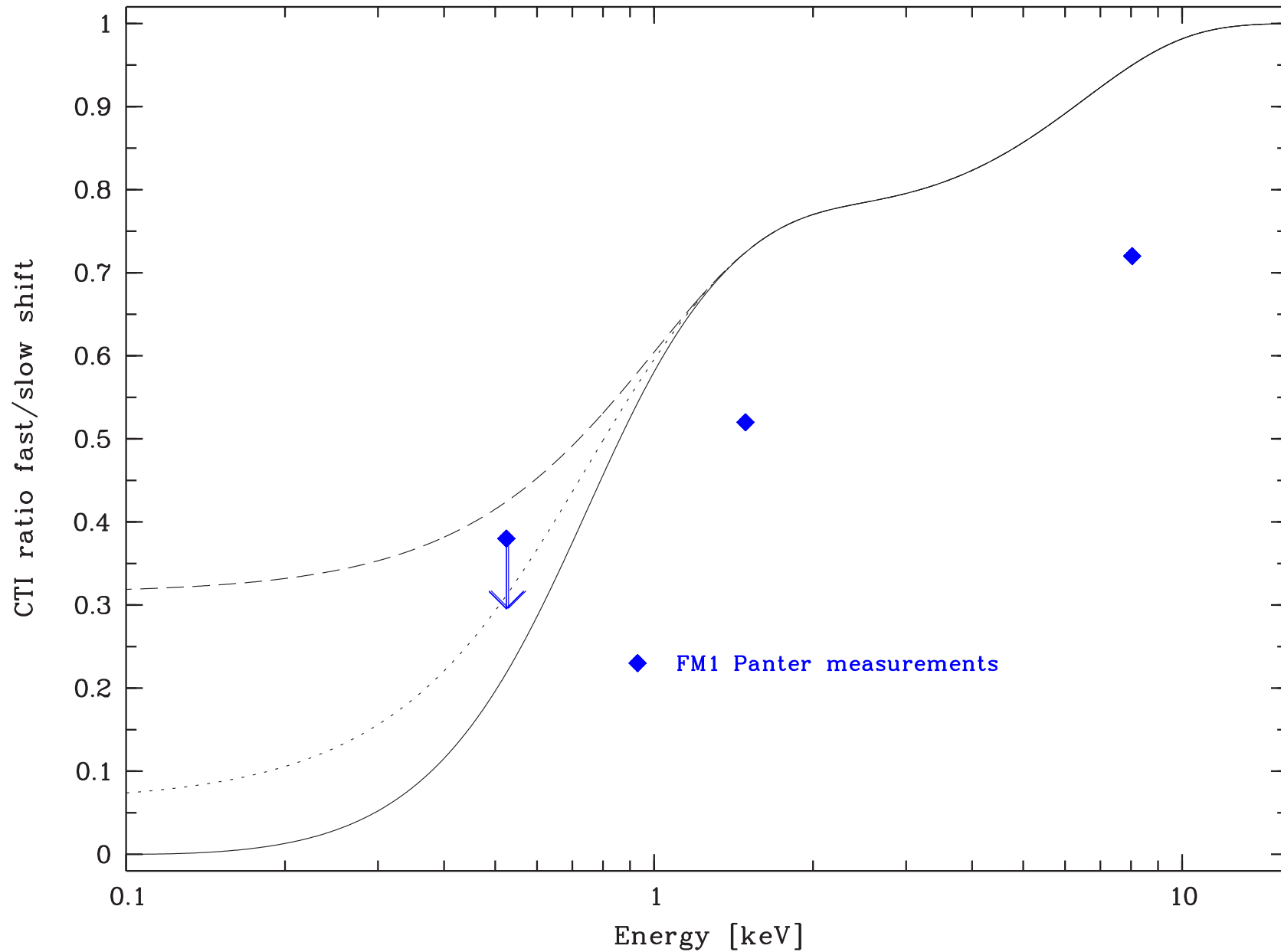
quantity to determine: step height = difference slow/fast shift CTI

EPN_CTI_####.CCF : CTI-HIGH_ADD_PAR : LWSW_PAR

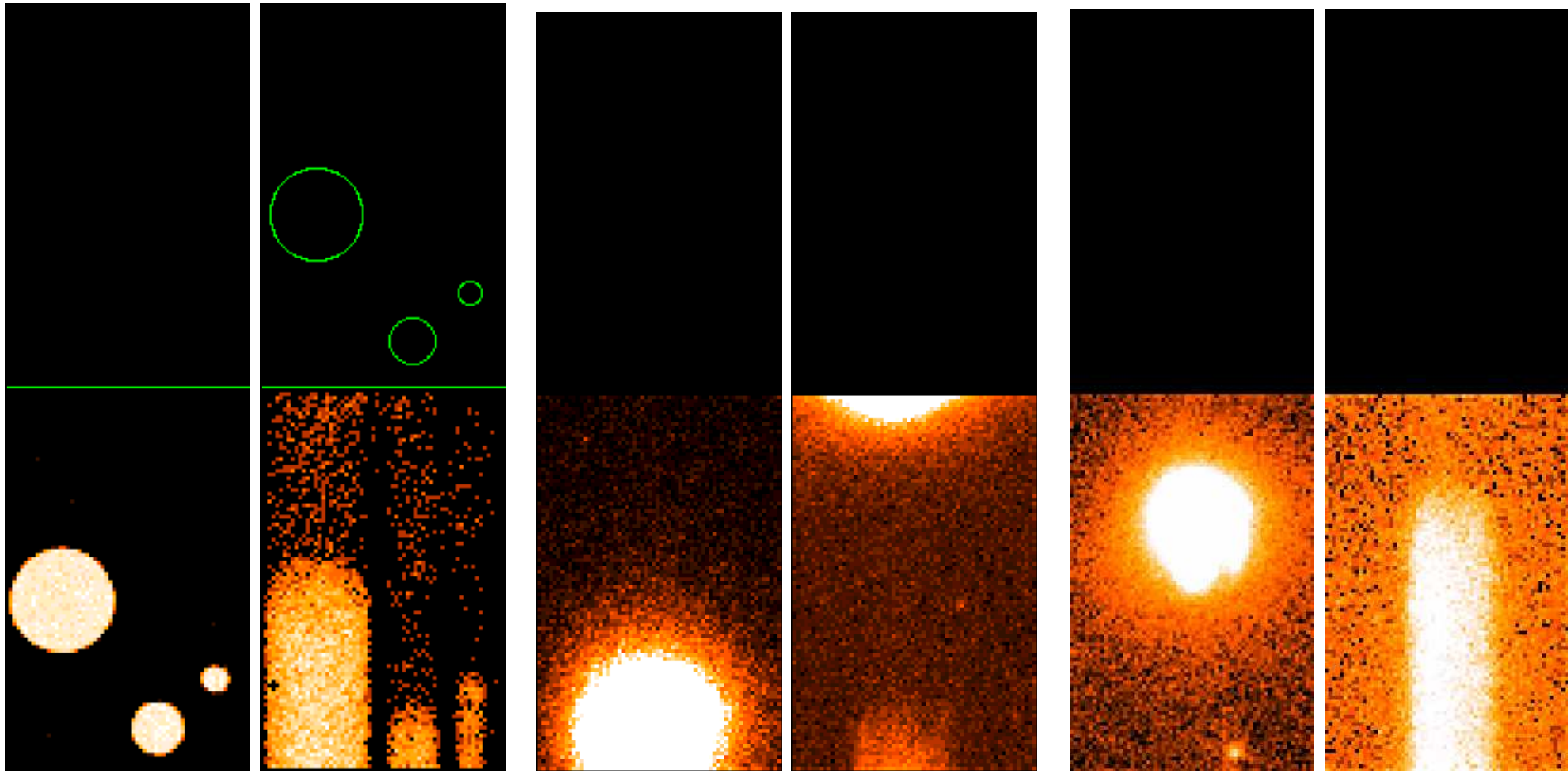
coded as parameterized function

LW	Cu-K	Al-K	Cu-L	O-K
Loss	67.13	22.09	12.56	9.77
Jump	18.87	10.62	9.70	6.18
frac.	0.28	0.48	0.77	0.63
func.	0.72	0.52	0.23	0.38

EPIC-pn Fast/Slow shift CTI: CCF function



NRCO-47: 0991_0137551301 + 0991_0137551401

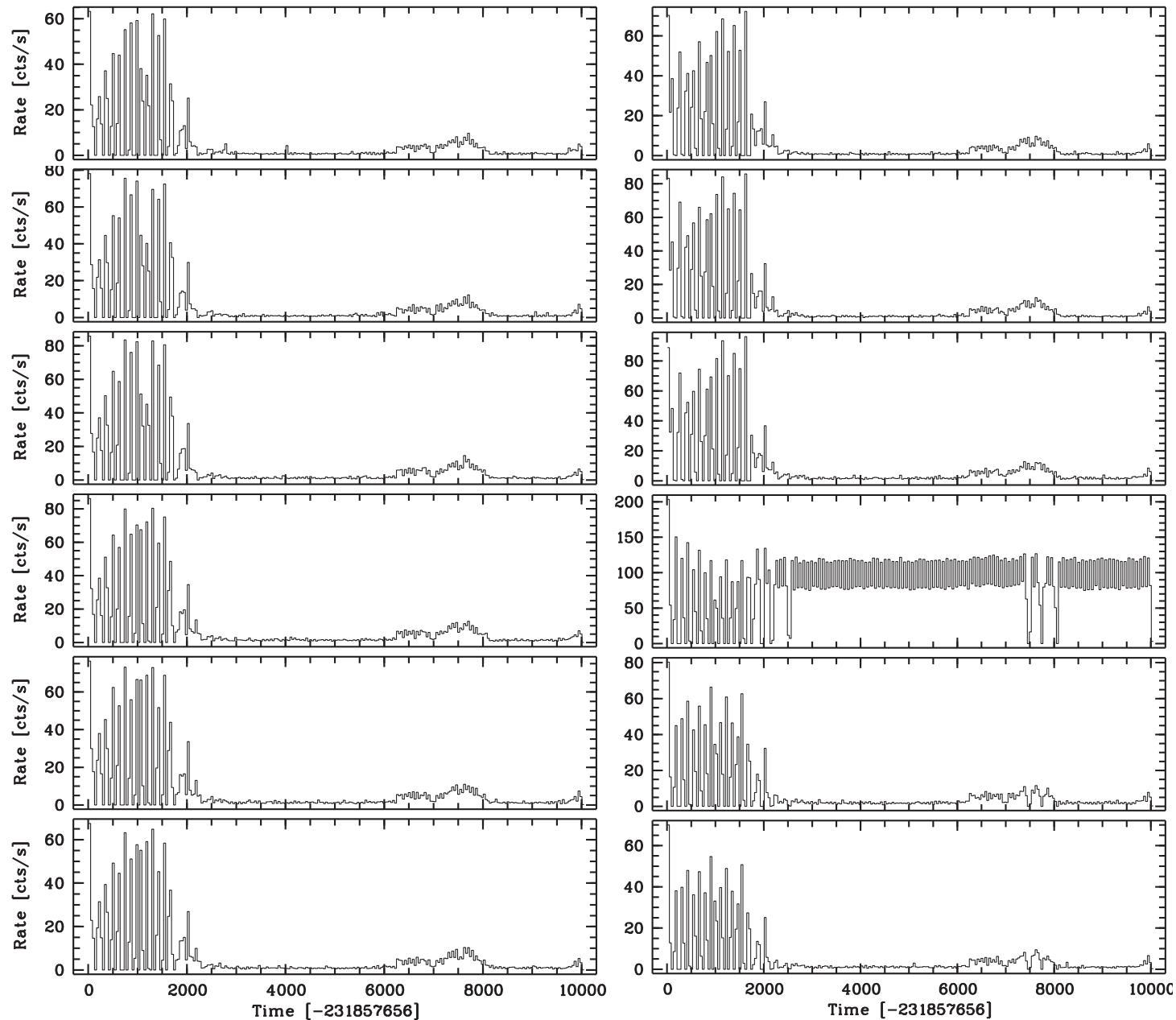


Panter pinholes

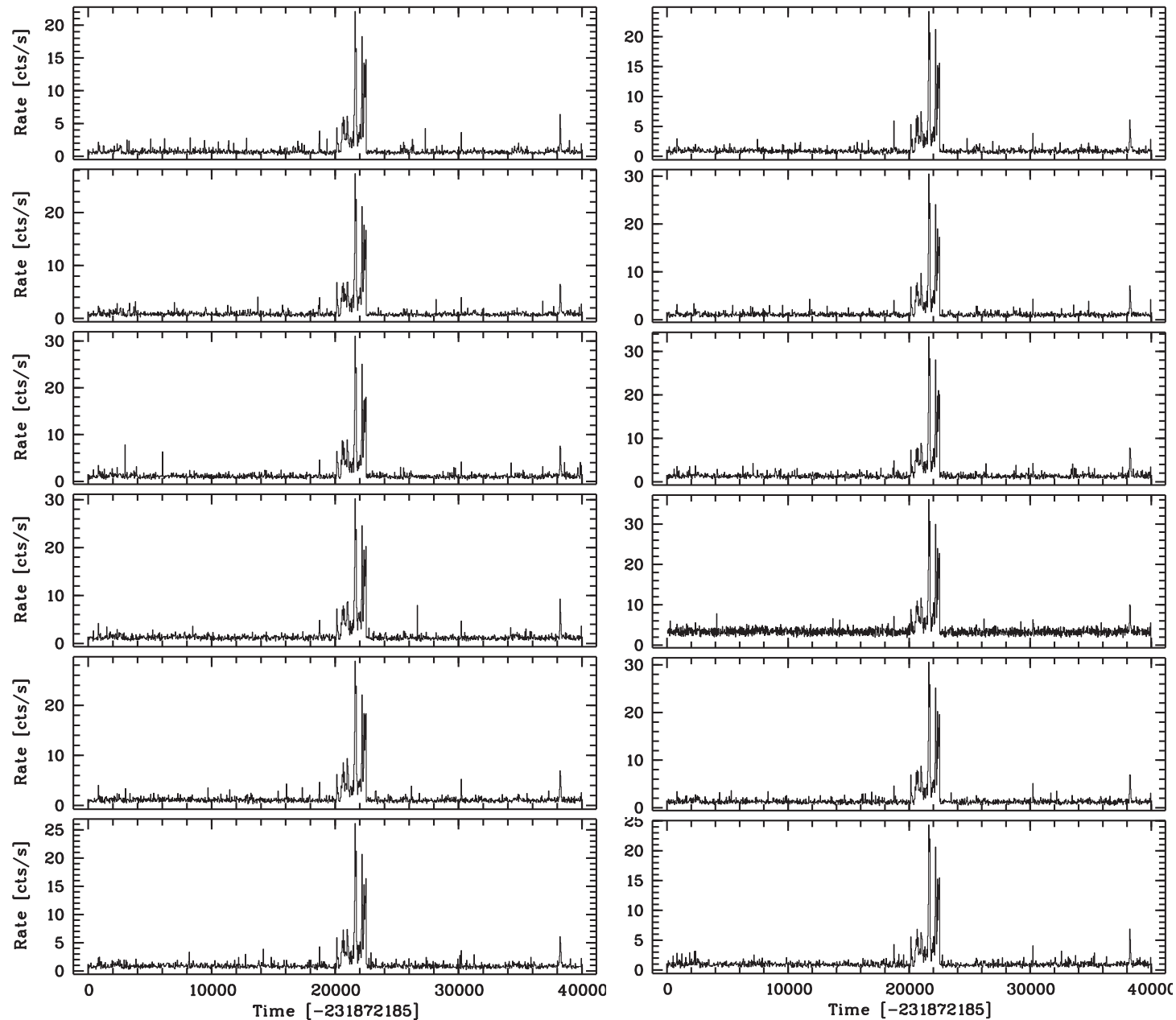
N132D (NRCO-31)

N132D (NRCO-47)

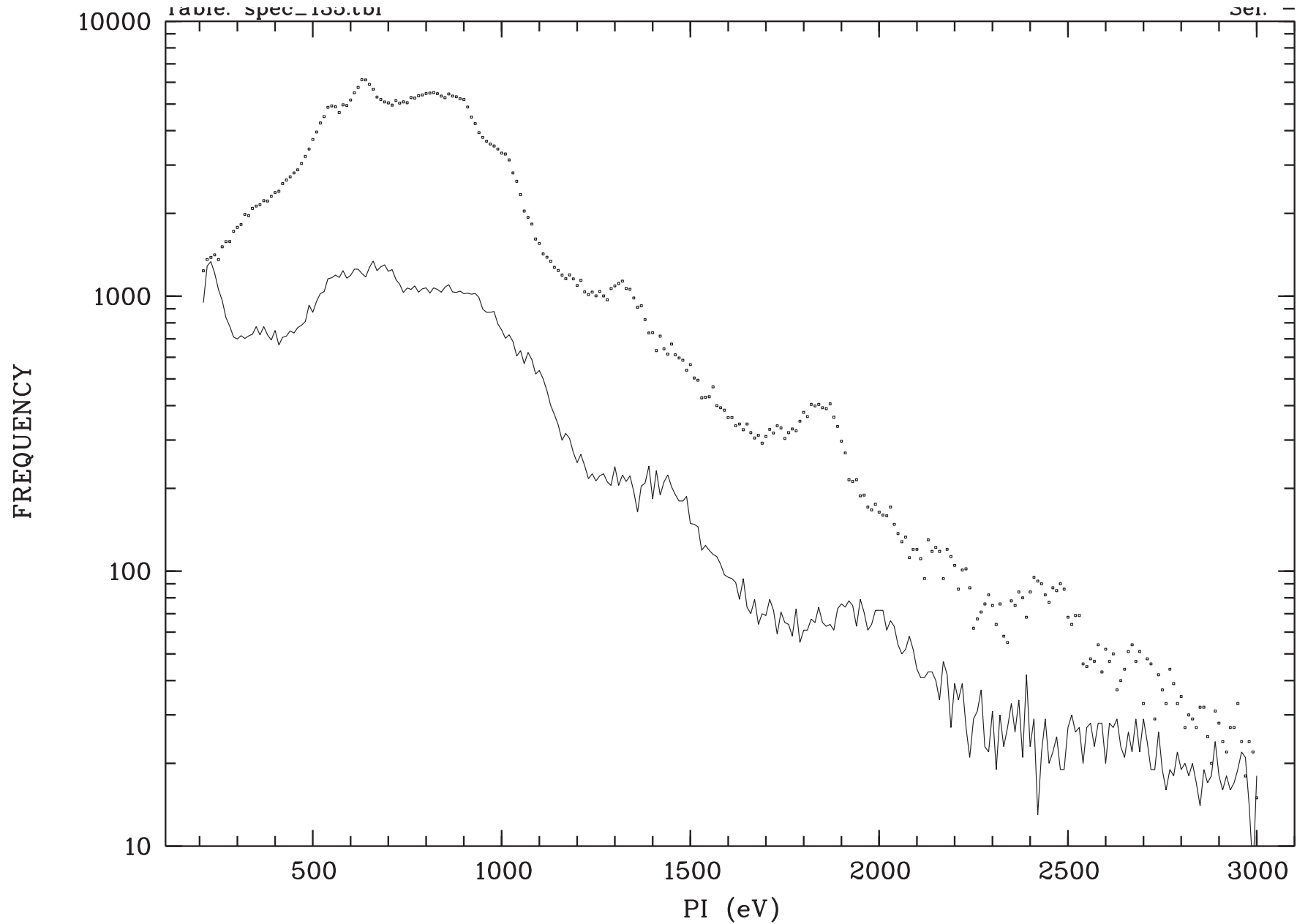
NRCO-47: 0991_0137551301_PNS001



NRCO-47: 0991_0137551401_PNS001



NRCO-47: spectra of N132D



SAS analysis

- requires gain correction, but no subsequent CTI correction
- required SAS change to write out energy values between the two CAL calls
- epevents-6.42 + epchain-8.55 (Dec.2004):
column PHA_GAIN if withphagaincolumn=Y
- cannot simply use XSPEC as line positions and widths are (intentionally) “wrong”
- line positions in adu (1 adu = 5 eV)

LW-035	LW-135	Δ
137.5	127.2	10.3
221.2	202.6	19.6
282.5	263.6	19.9
393.8	369.2	24.6

- determine model function parameters for CCF