

Calibration measurements for the EPIC-pn window modes

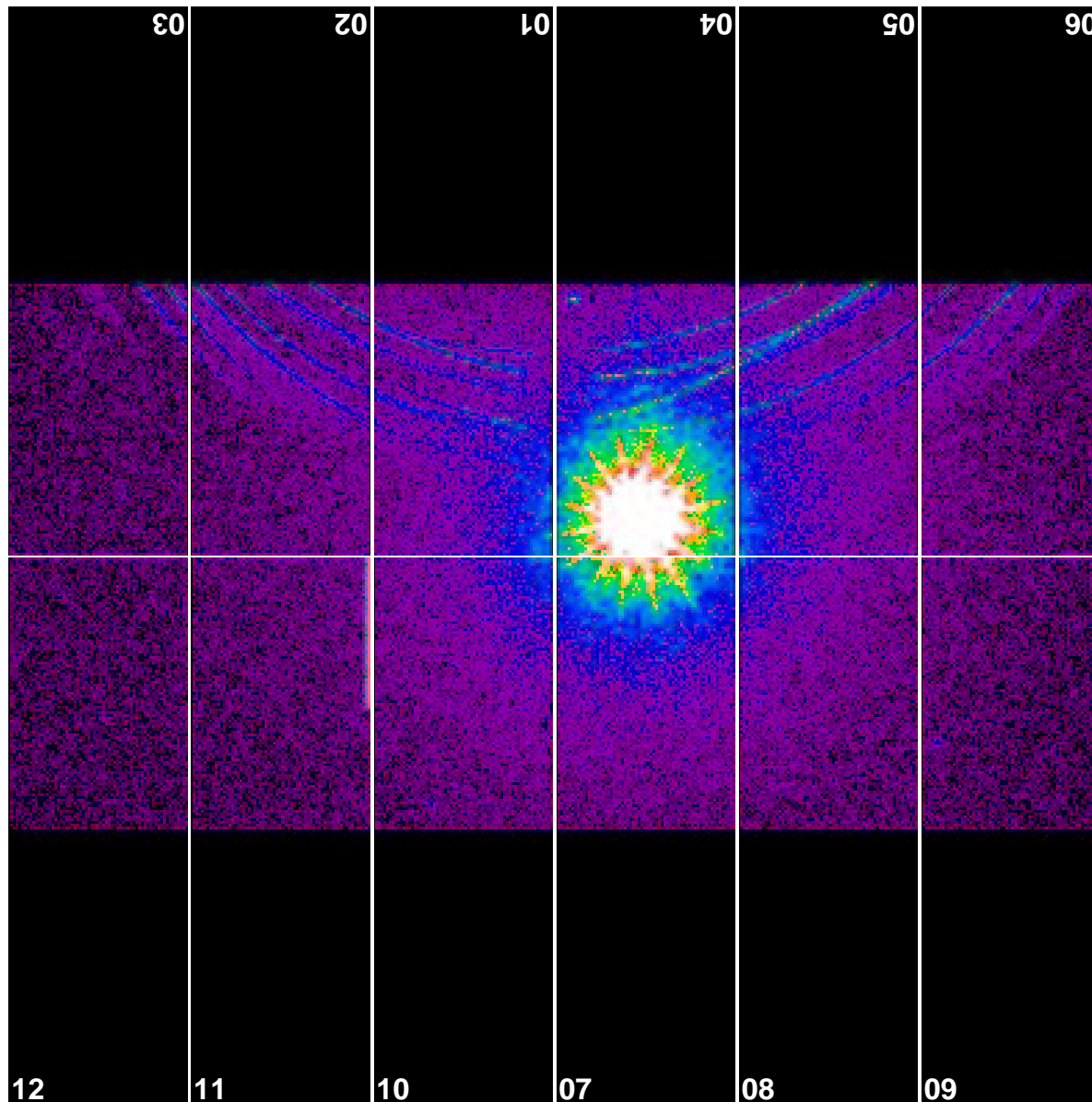
A preliminary report

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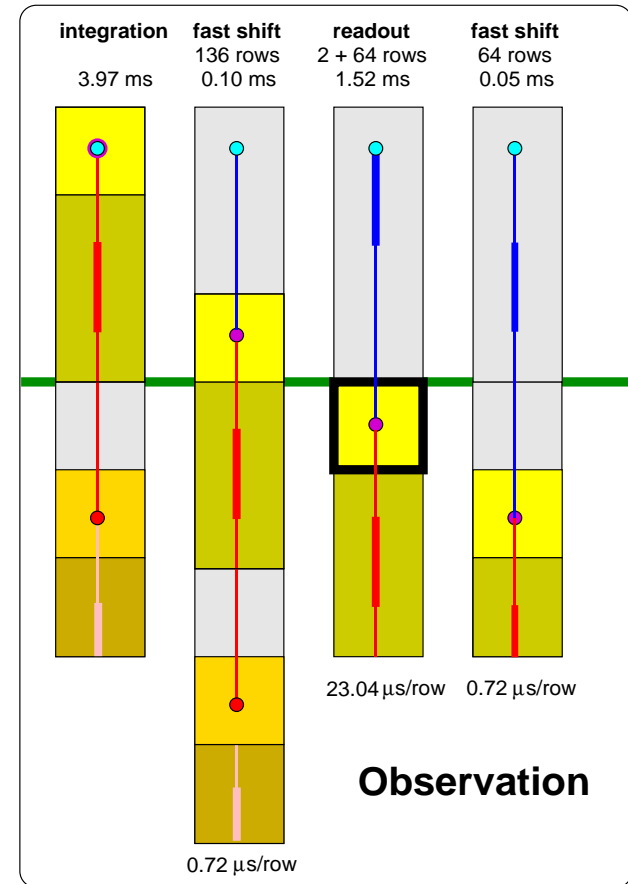
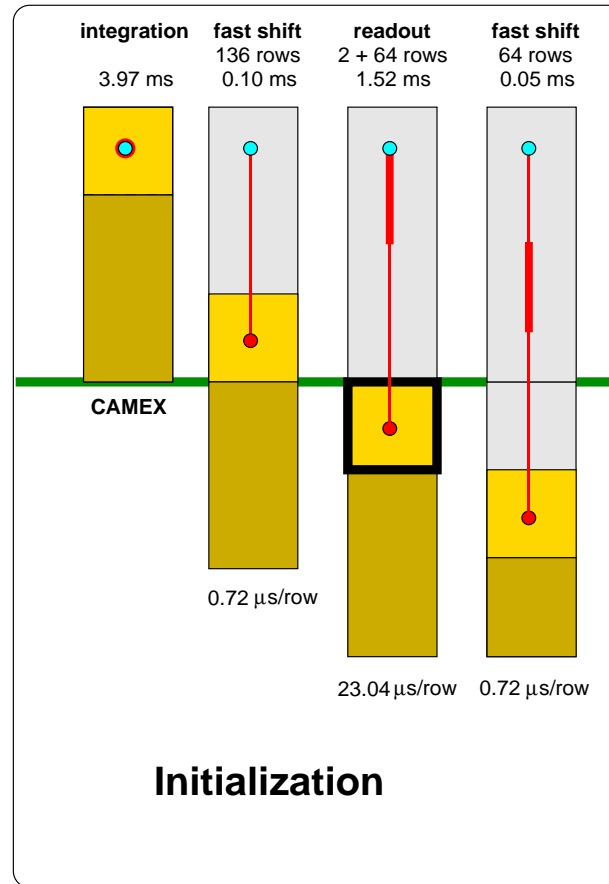
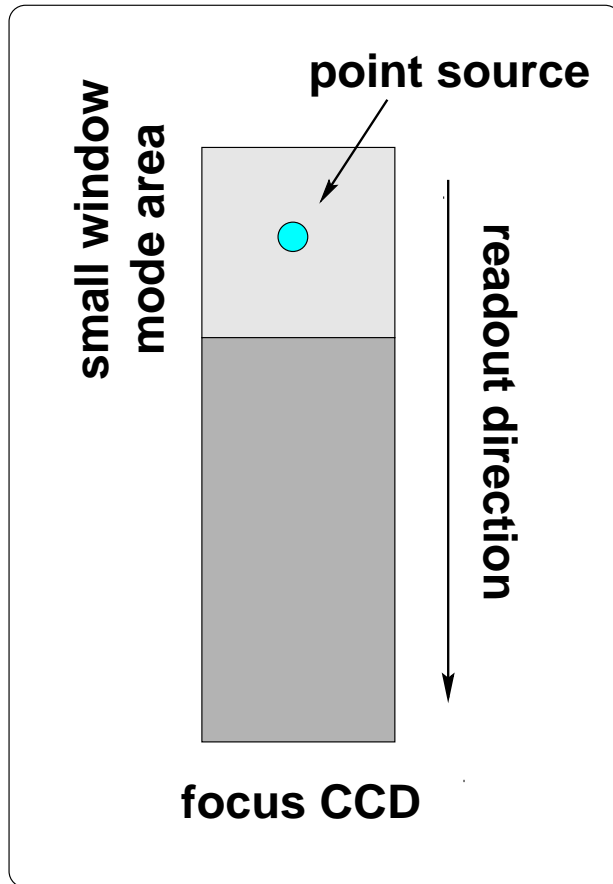
- Window modes: LW + SW
- CTI correction
- Measurements with FM1 at Panter
- Conclusions for FS

EPIC-pn window modes: integration, shift, read-out

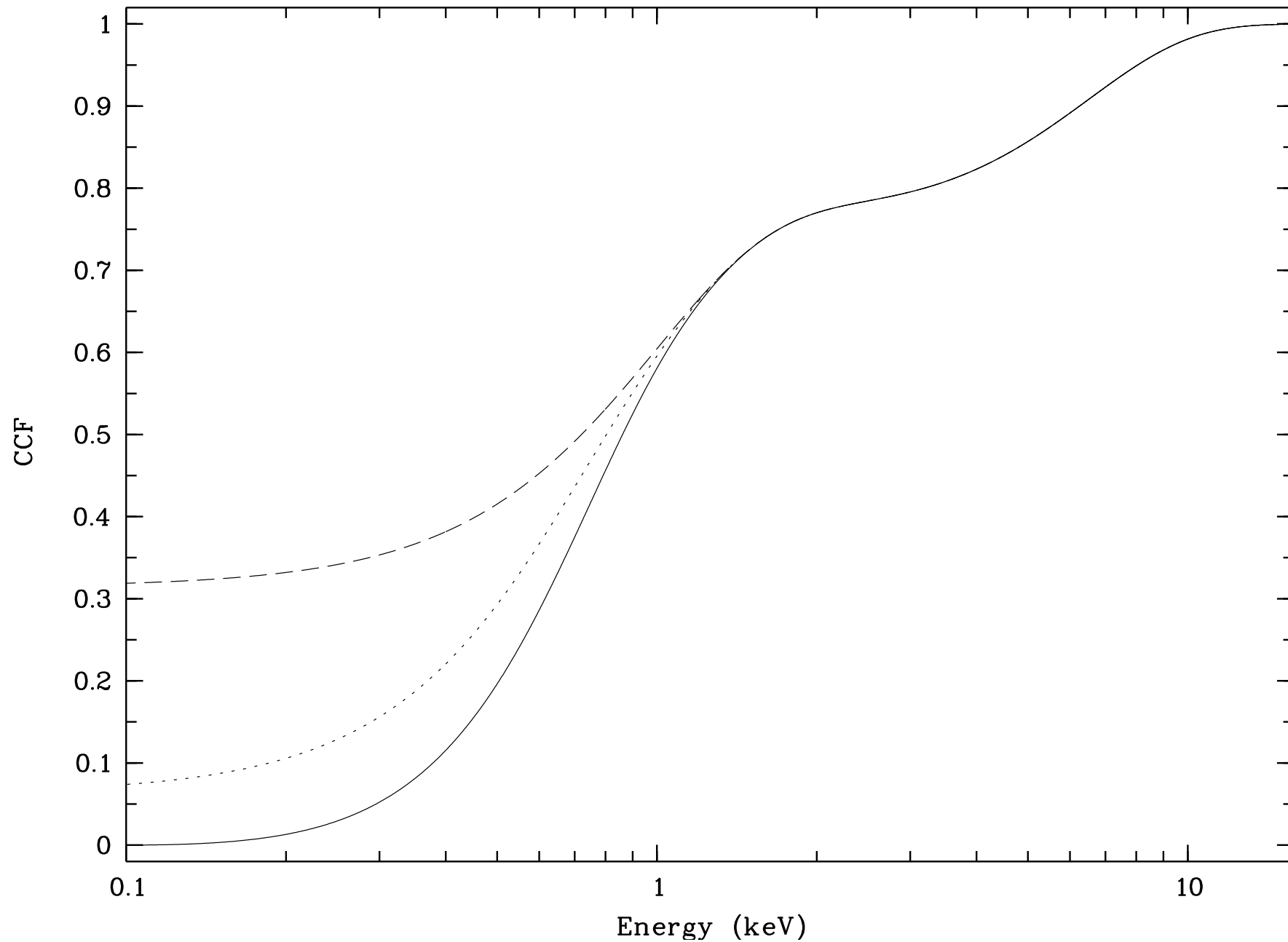


- only parts of CCD used
- integration of 100 (64) rows, 45.14 (3.93) ms
- fast shift of window area toward CAMEX, in 0.072 (0.098) ms
- read-out as in full frame mode, 2.45 (1.64) ms
- fast shift of read-out area

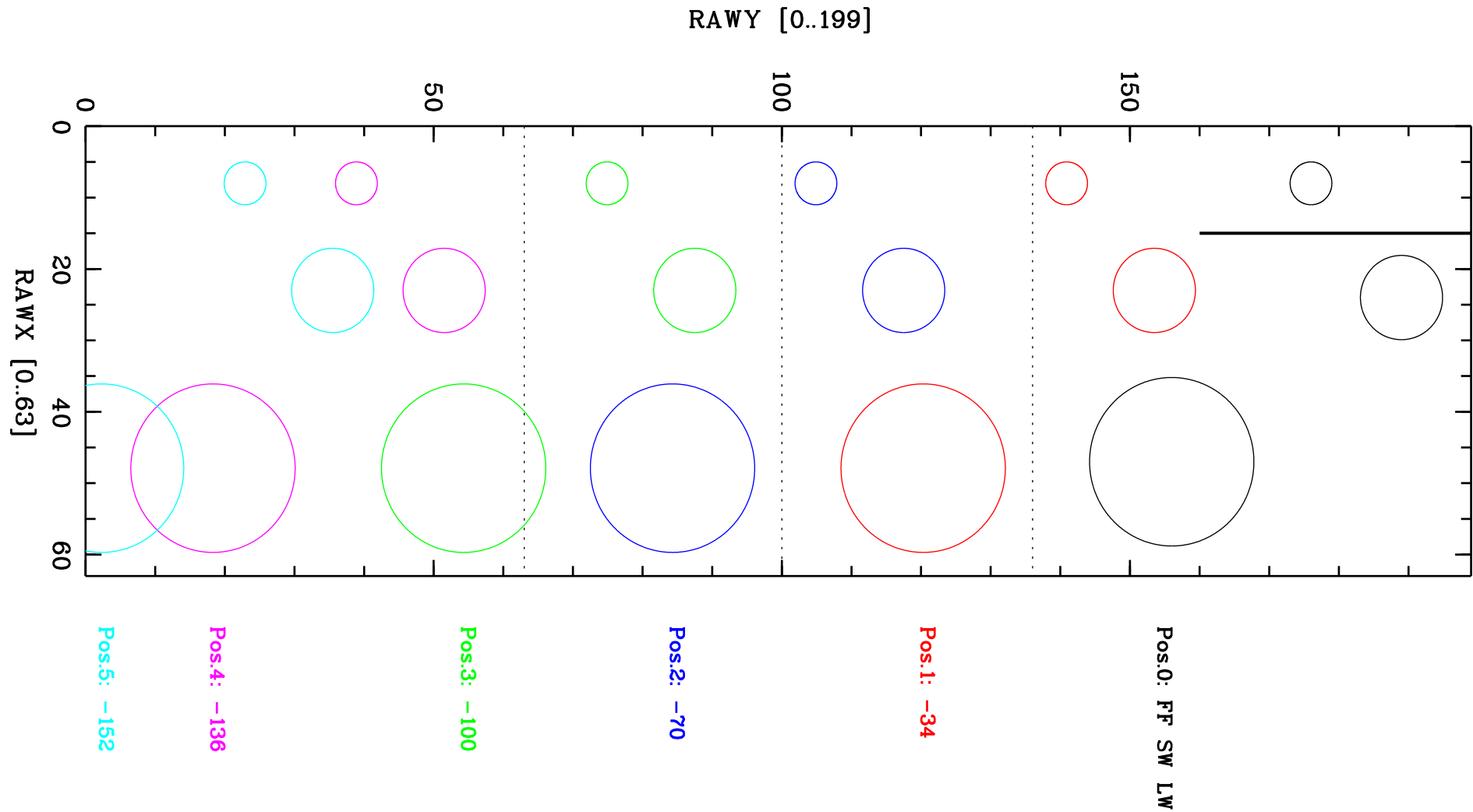
EPIC-pn window modes: integration, shift, read-out



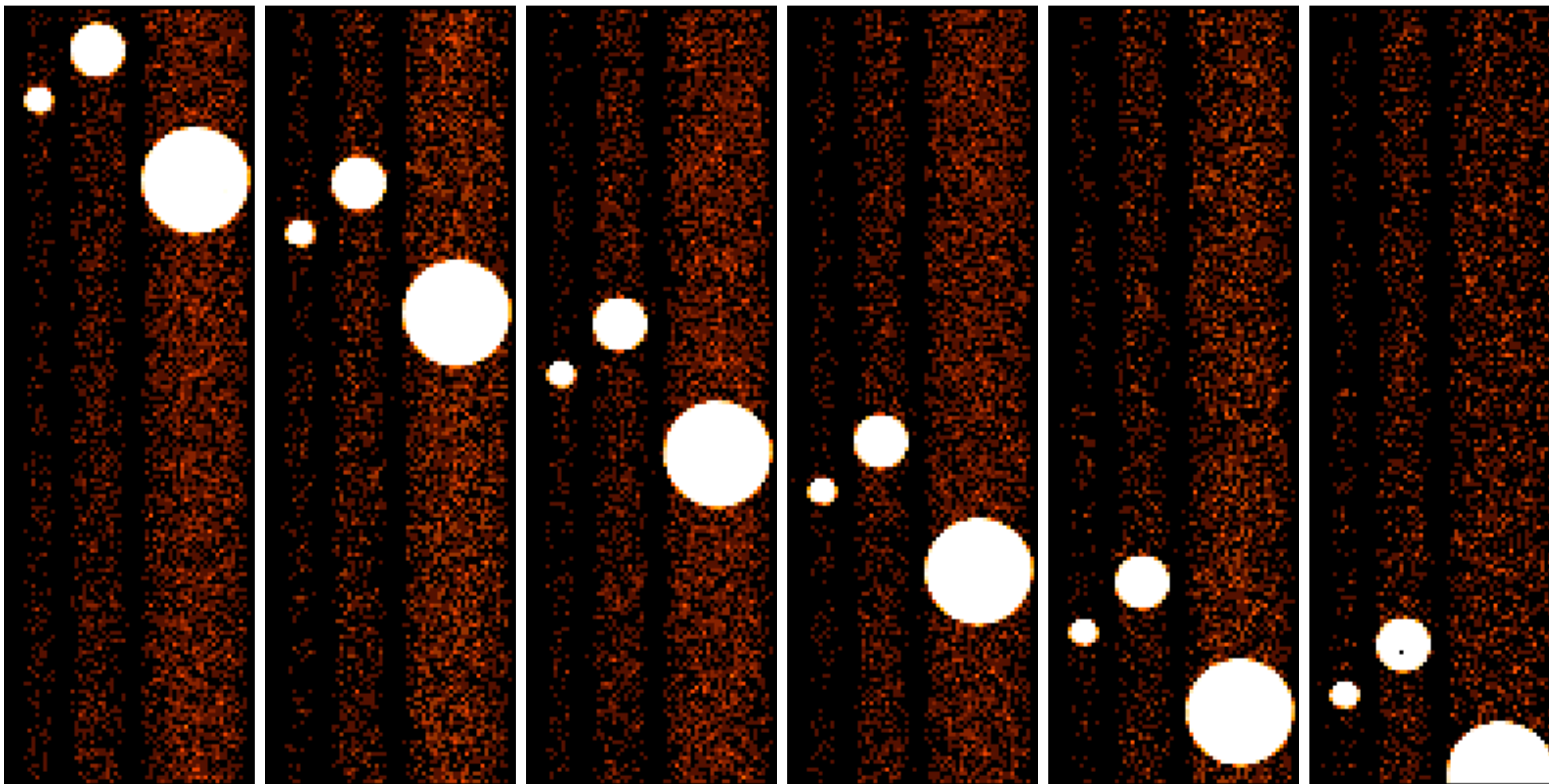
EPIC-pn window modes: CTI correction function



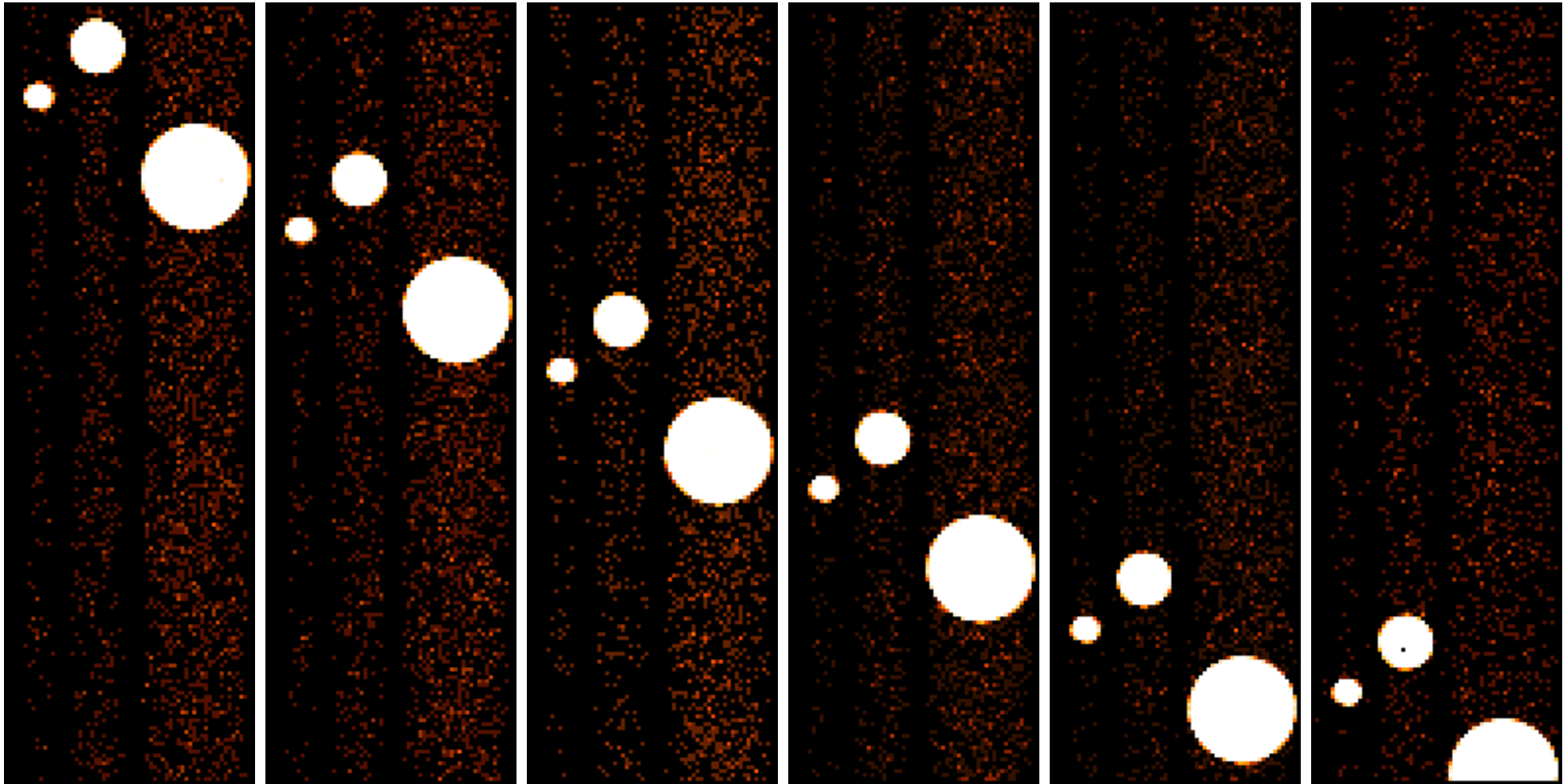
EPIC-pn: pinhole measurements: design



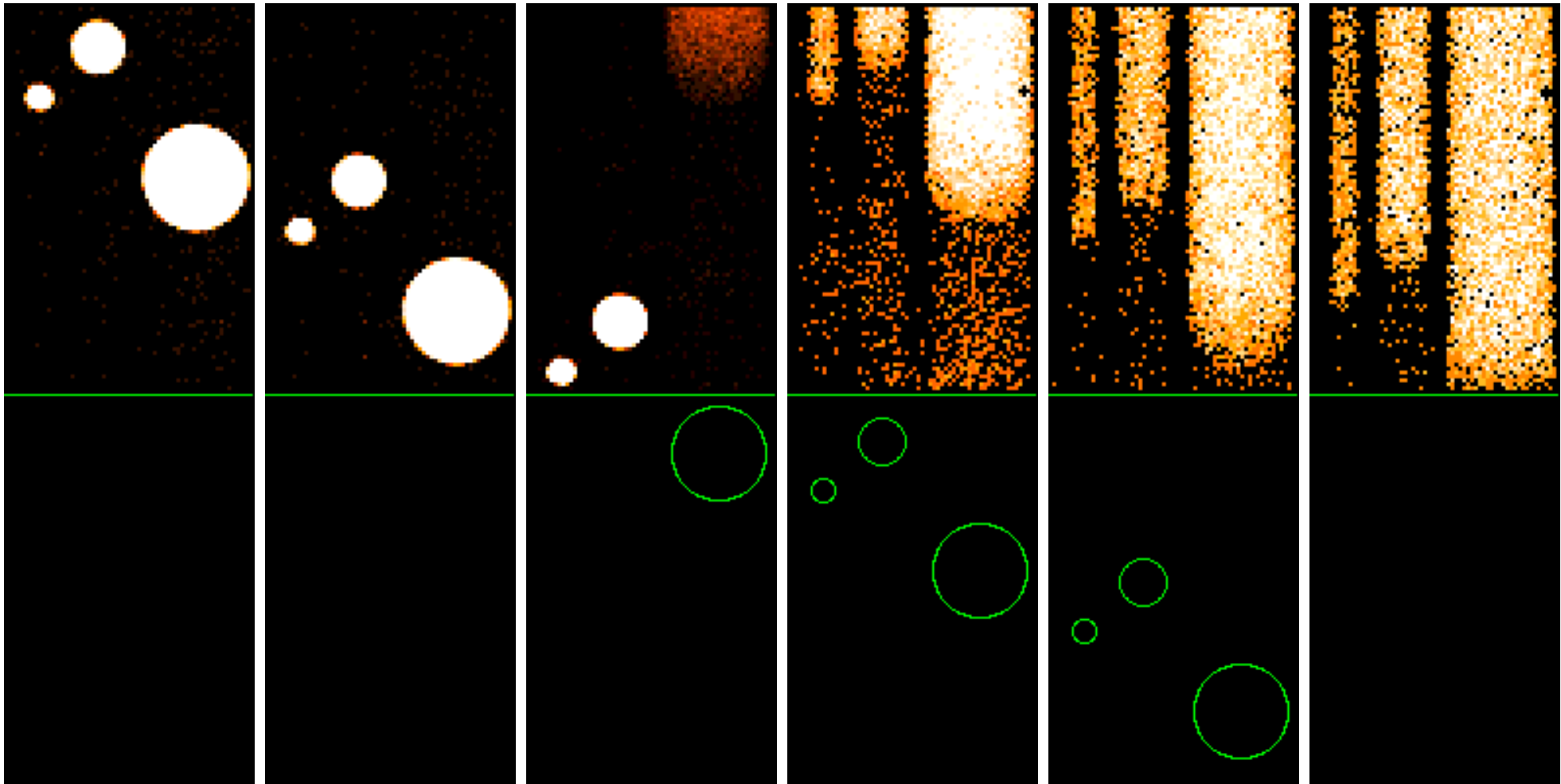
EPIC-pn: pinhole measurements: FF mode



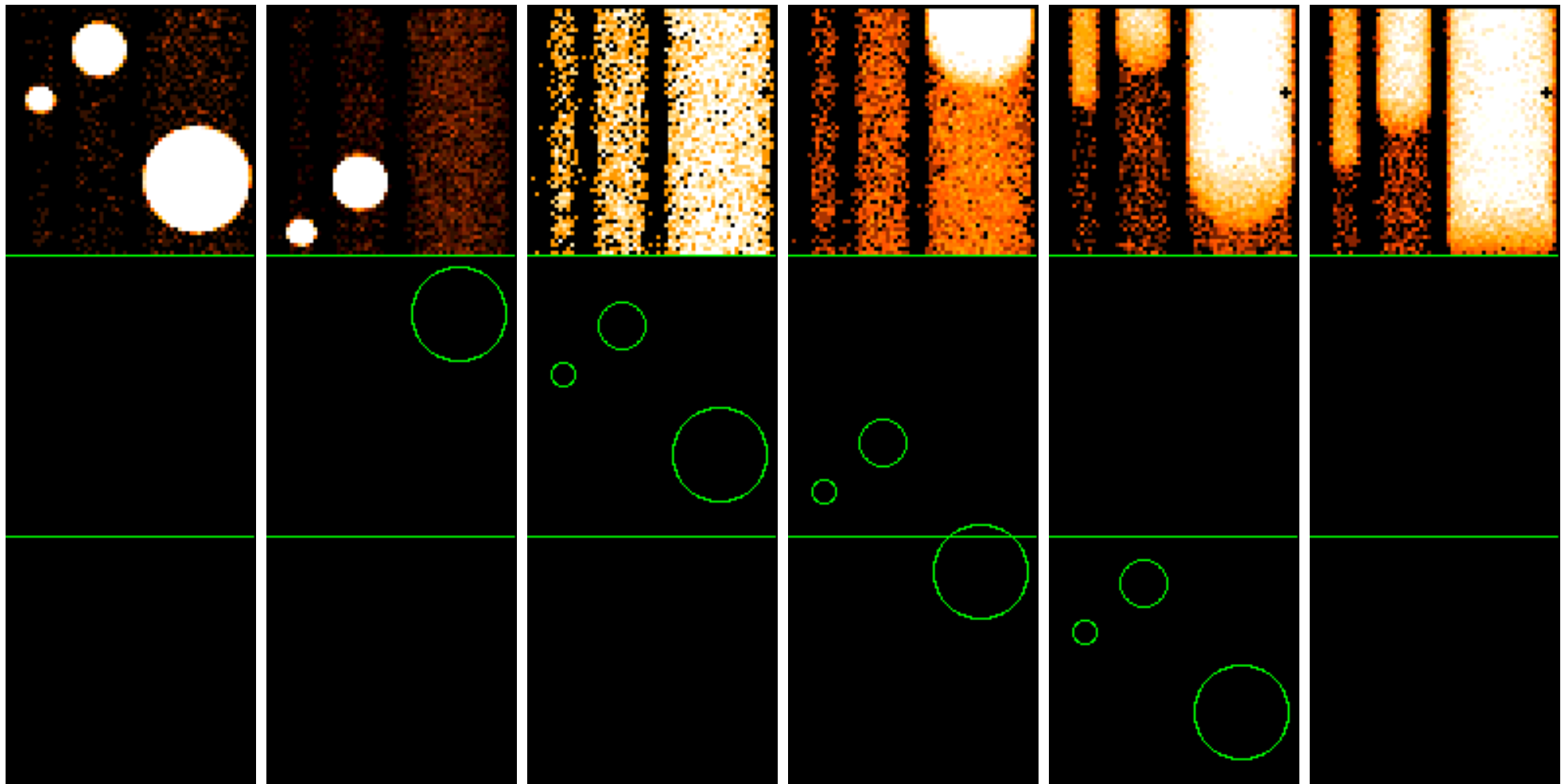
EPIC-pn: pinhole measurements: eFF mode



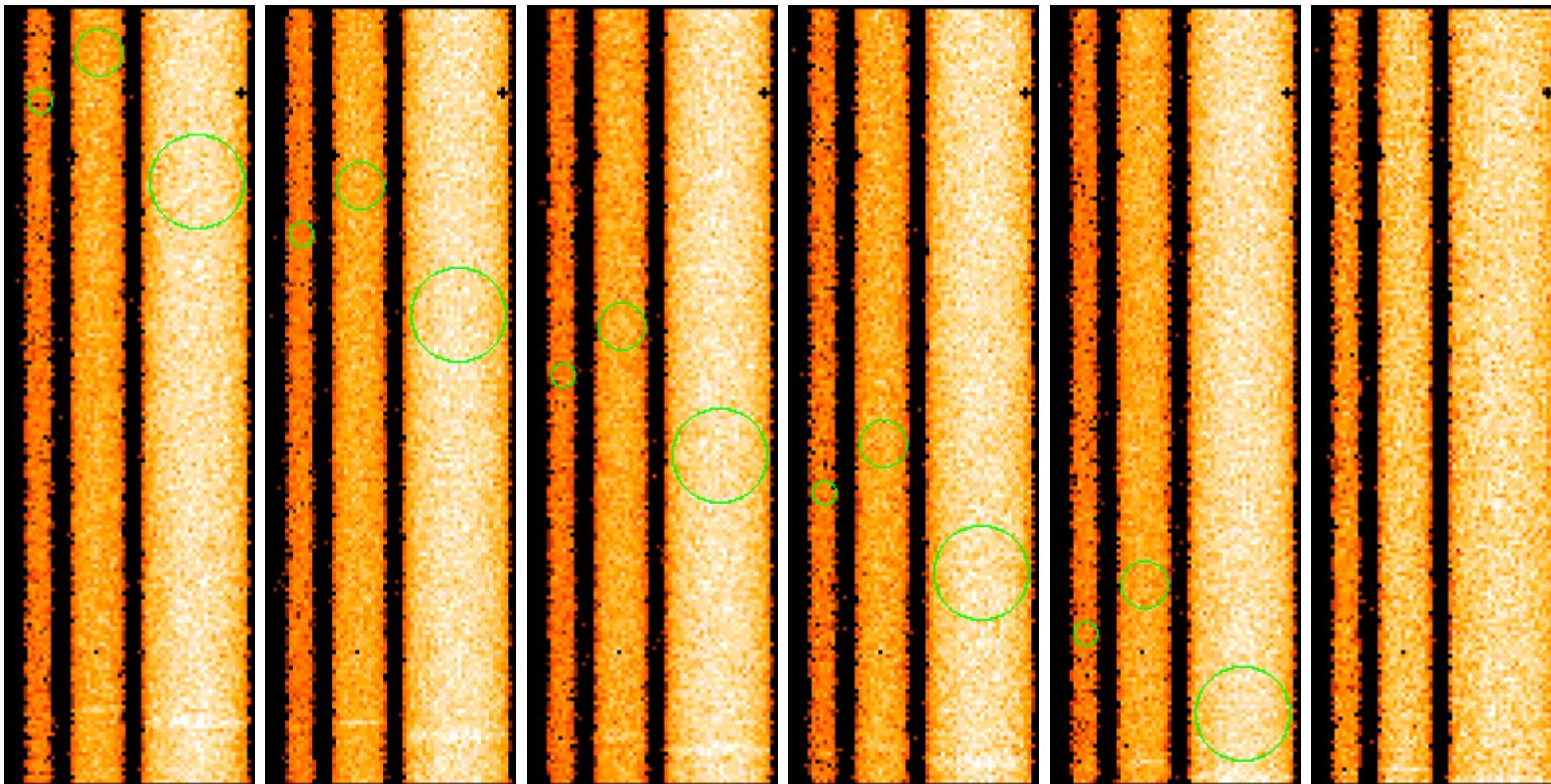
EPIC-pn: pinhole measurements: LW mode



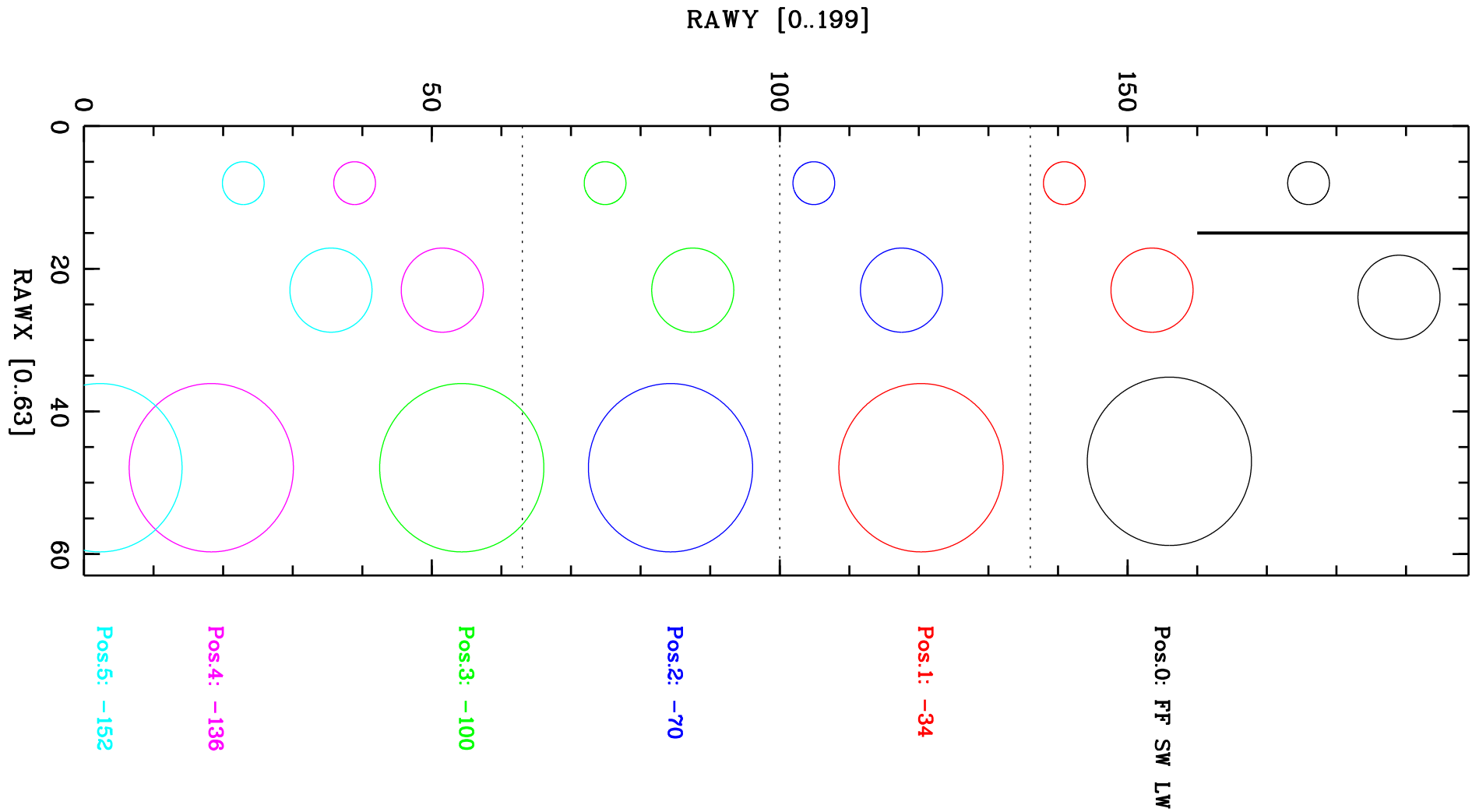
EPIC-pn: pinhole measurements: SW mode



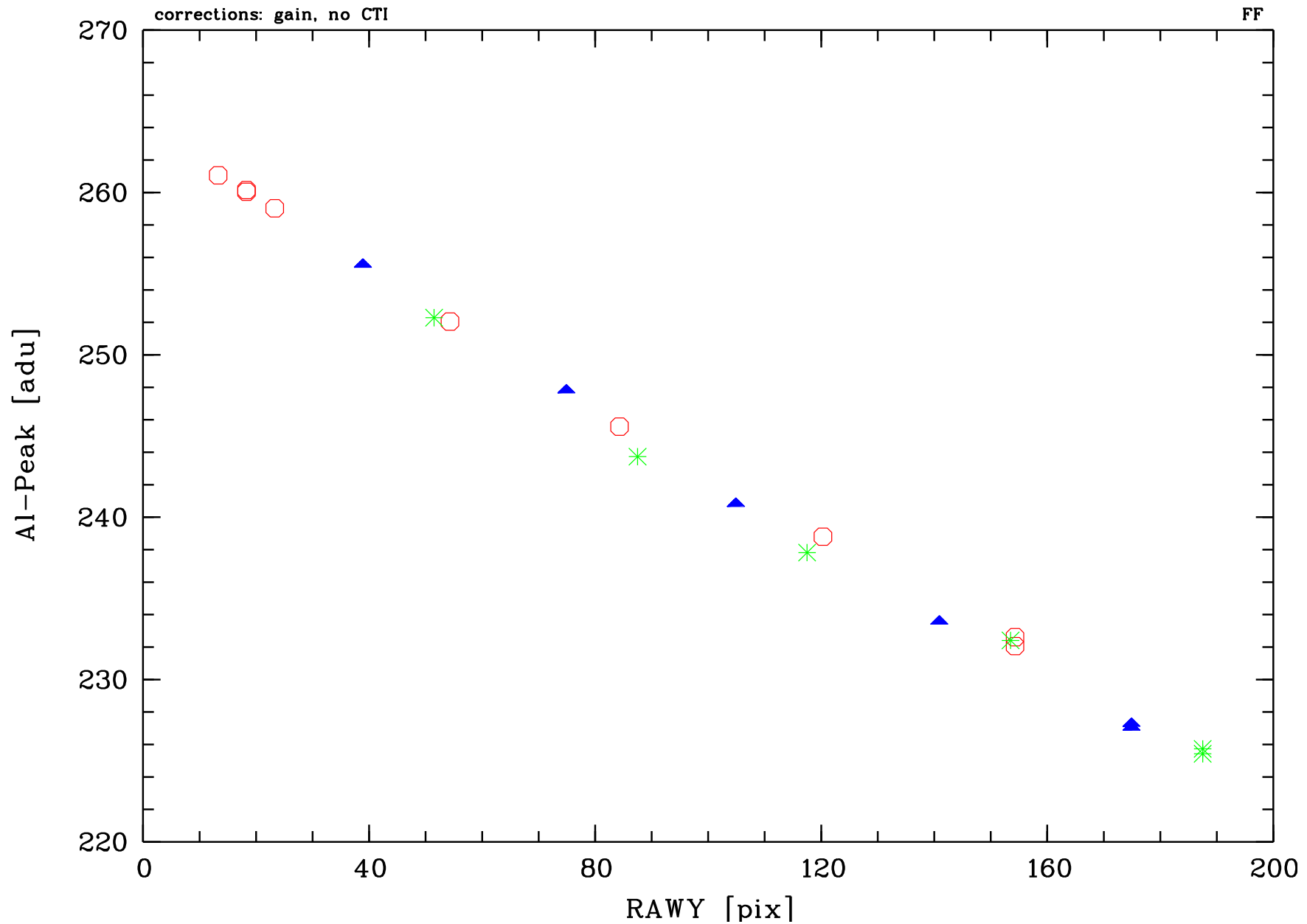
EPIC-pn: pinhole measurements: TI mode



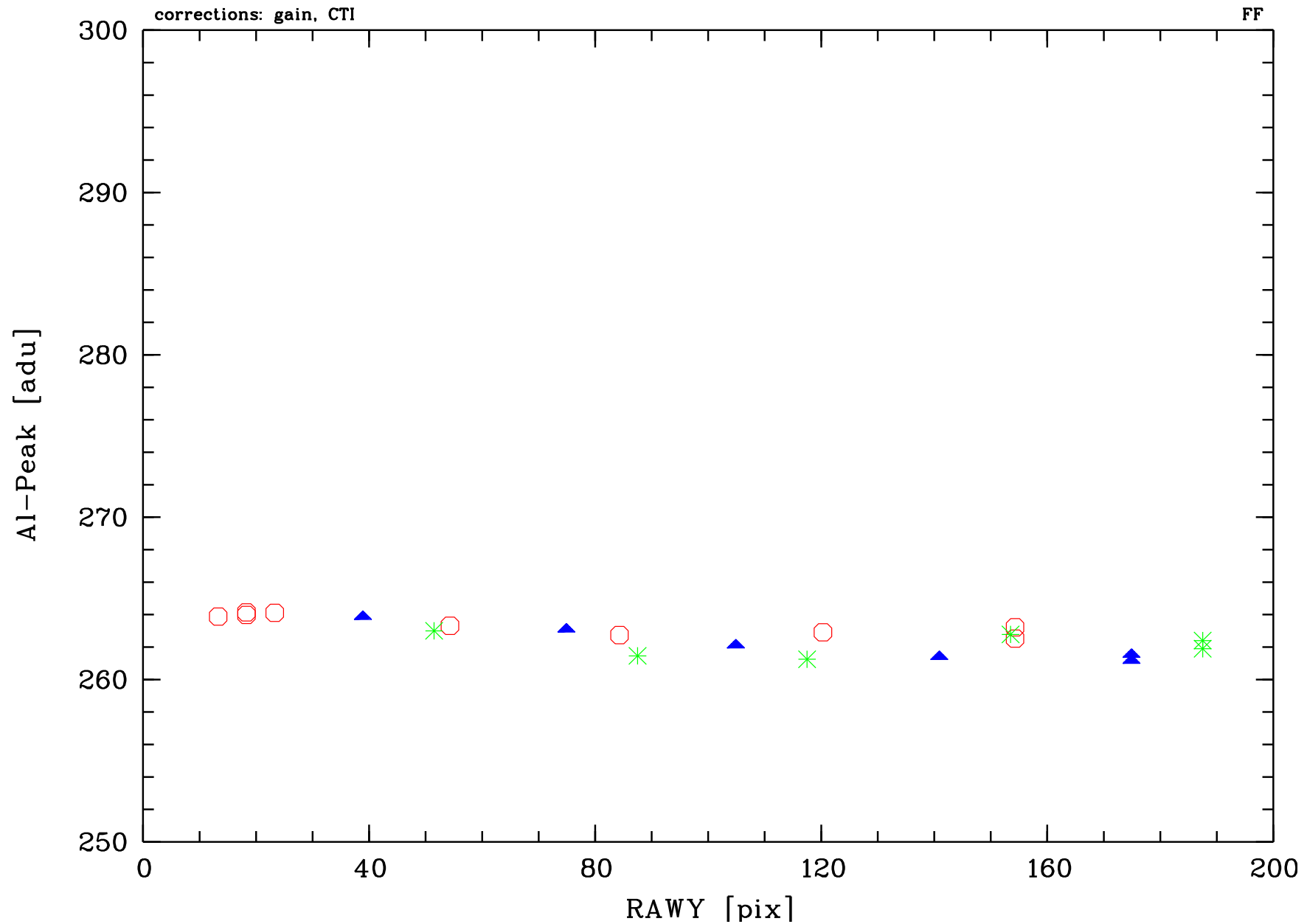
Reminder: pinhole measurements: design



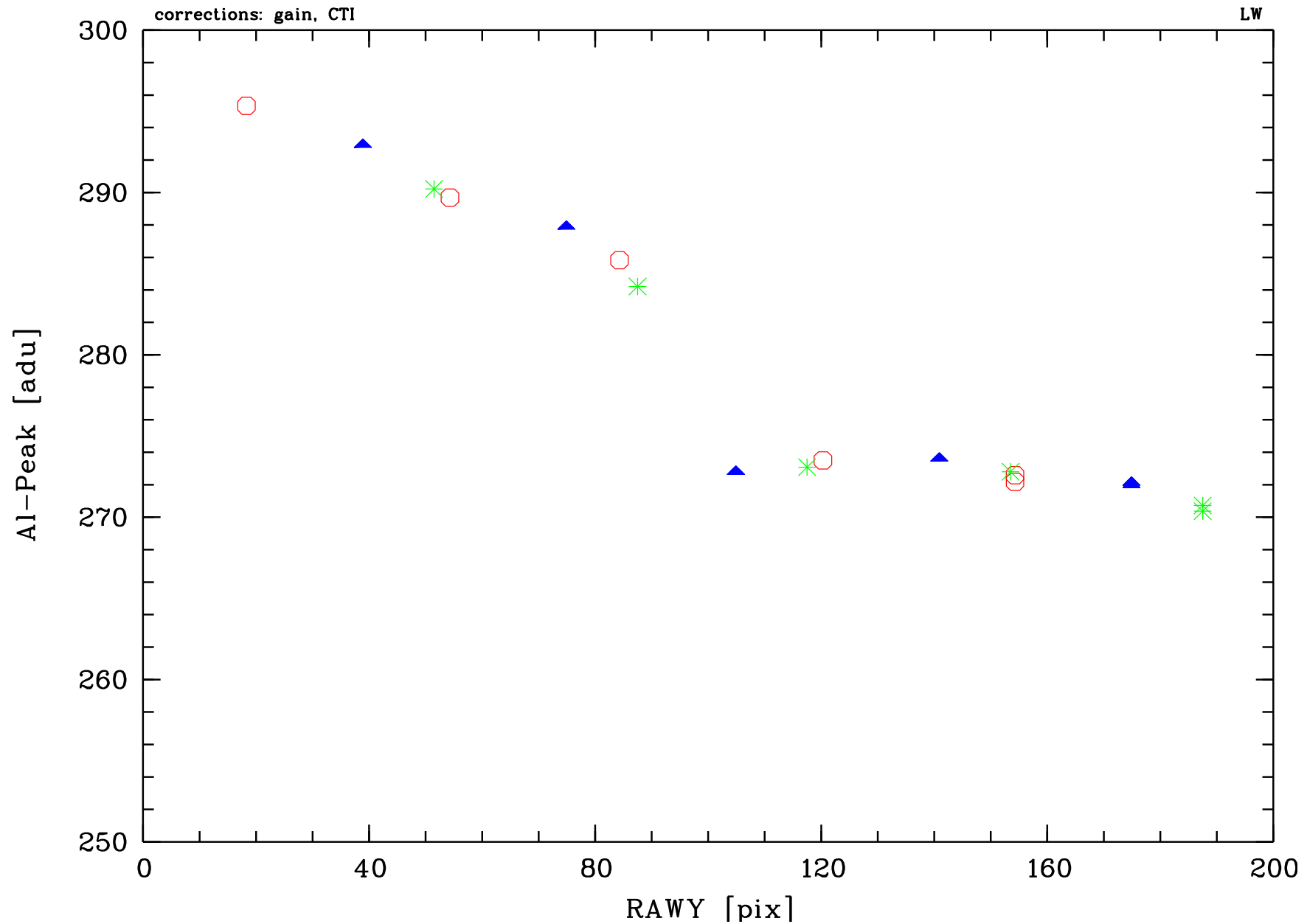
Pinhole measurements: FF mode, Al-K (no CTI)



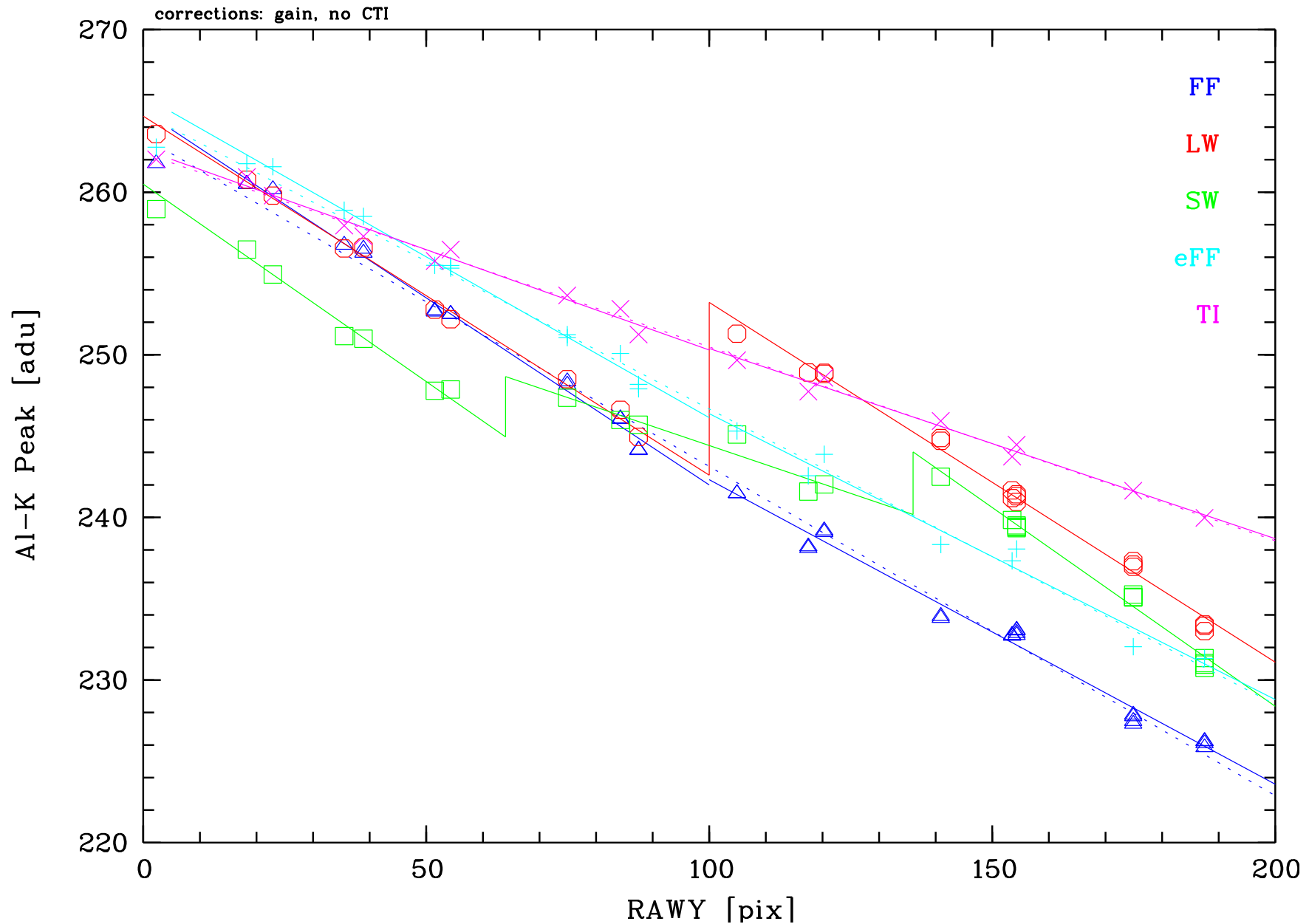
Pinhole measurements: FF mode, Al-K (CTI)



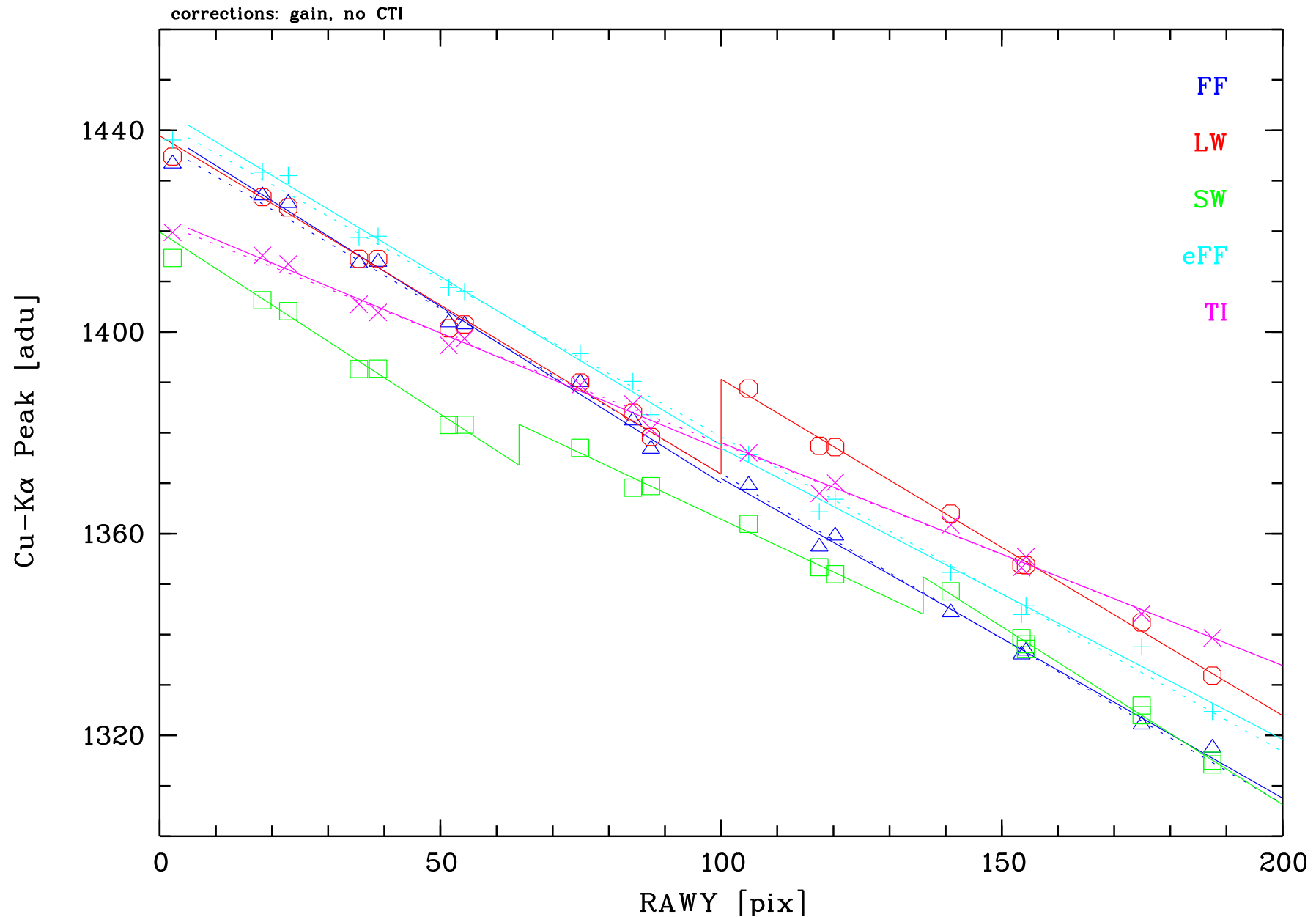
Pinhole measurements: LW mode, Al-K (FF CTI)



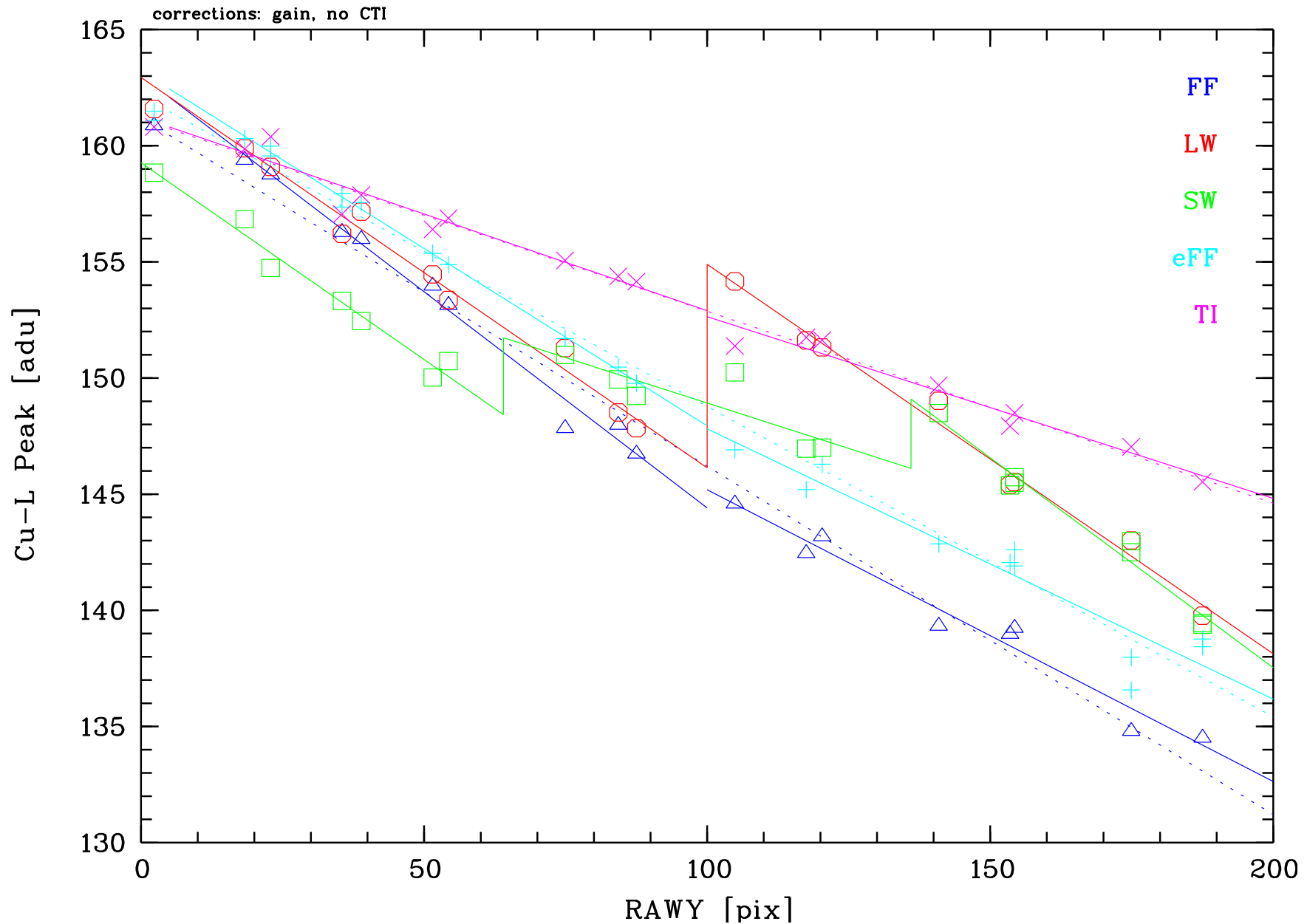
Pinhole measurements: all modes, Al-K



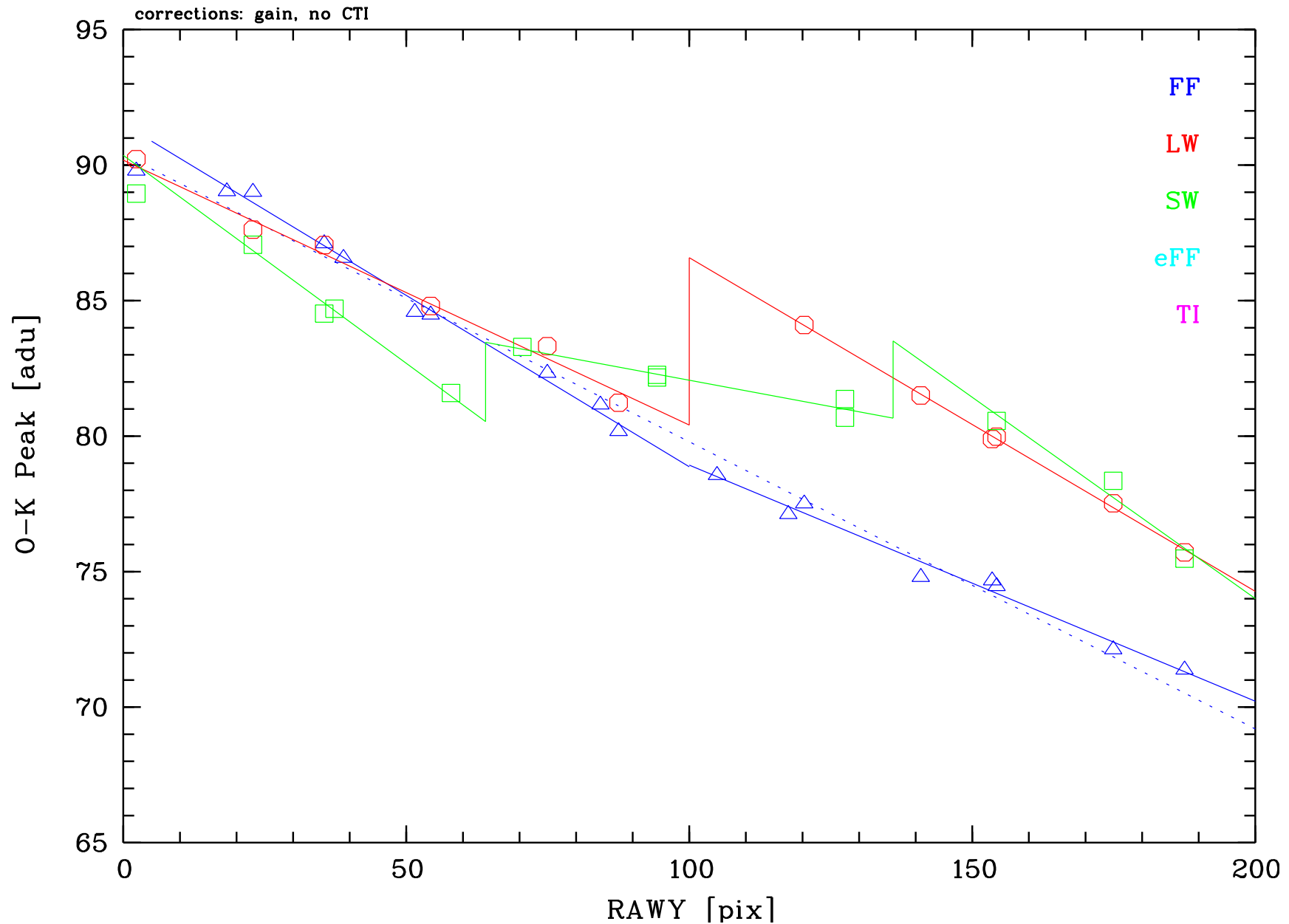
Pinhole measurements: all modes, Cu-K α



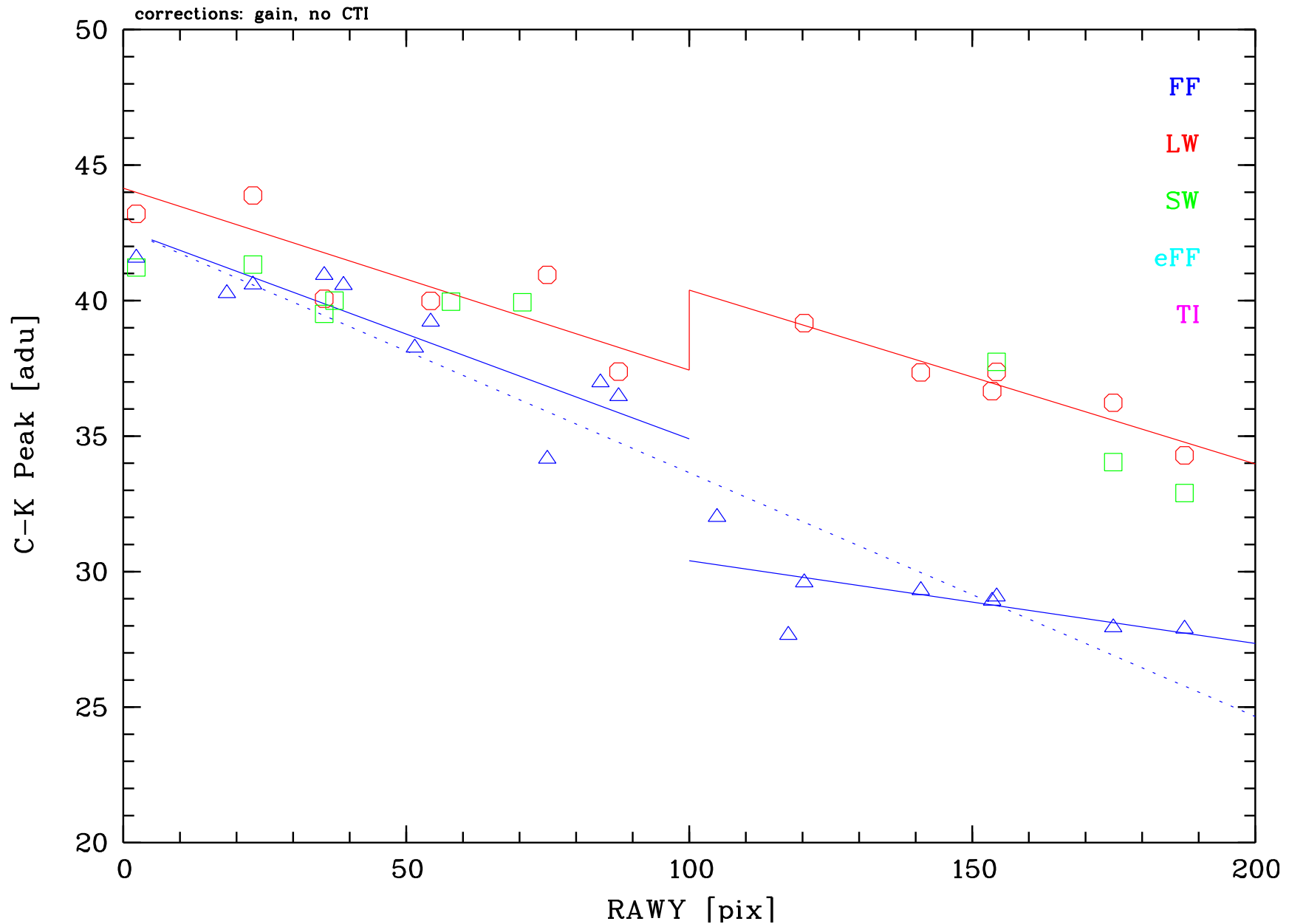
Pinhole measurements: all modes, Cu-L



Pinhole measurements: all modes, O-K



Pinhole measurements: all modes, C-K



EPIC-pn CTI losses for FM1: adu/pixel

	Cu-K	Al-K	Cu-L	O-K	C-K
<hr/>					
<i>all</i>					
eFF	0.625	0.182	0.134		
FF	0.655	0.203	0.150	0.106	0.090?
LW	0.667	0.221	0.168	0.123	0.064?
SW	0.706	0.244	0.181	0.149	0.149?
TI	0.439	0.119	0.083		
<hr/>					
<i>camex</i>					
FF	0.699	0.230	0.186	0.126	
LW	0.671	0.221	0.168	0.098	
SW	0.723	0.243	0.170	0.153	
<hr/>					
<i>shift</i>					
SW	0.523	0.118	0.078	0.039	

EPIC-pn CTI jumps for FM1: adu

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

Conclusions

- Trivial: method can be used to derive calibration parameters for FM1
- ... gain seems to be mode-dependent
- ... a few more measurements needed
- Trivial: method could be used also for frame-store devices
- calibration parameters for FM1 differ from implementation for FS
- in-orbit calibration possible: NRCO-31:
e.g. N132D in nominal position and in ”-100”