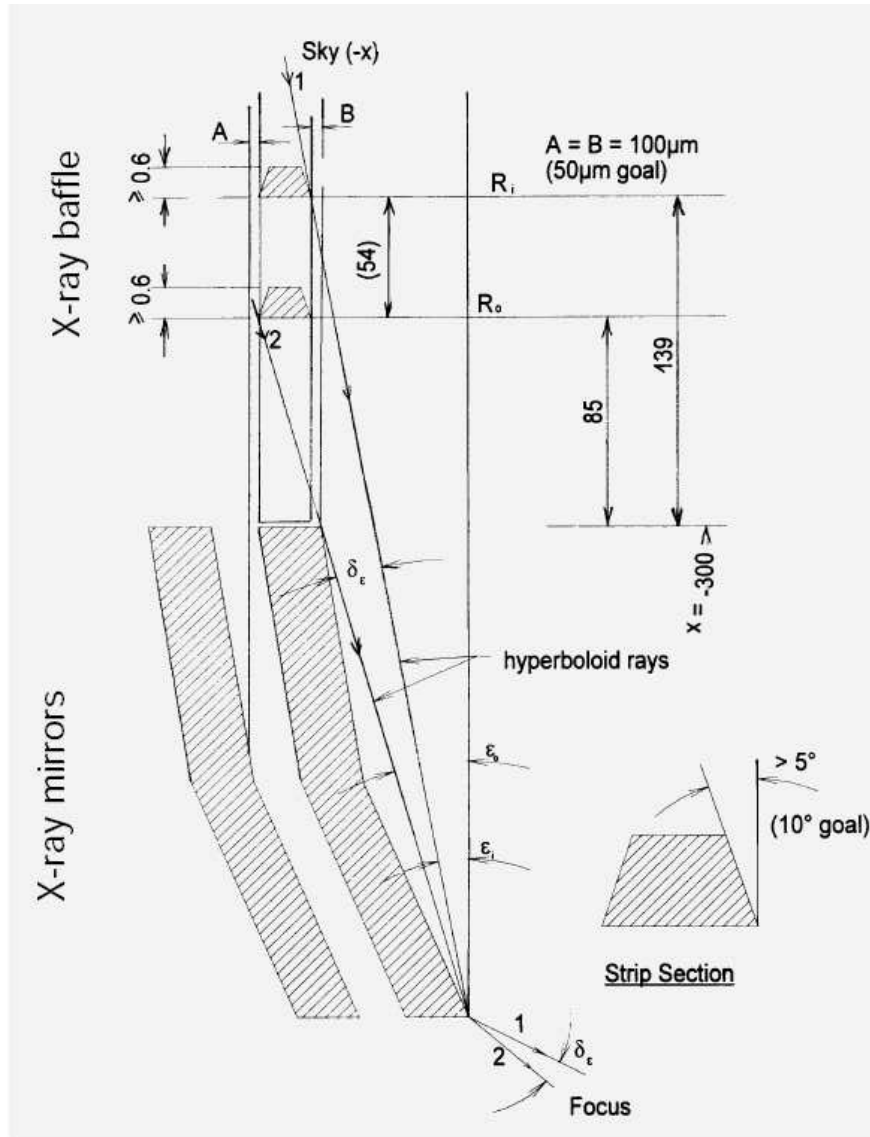


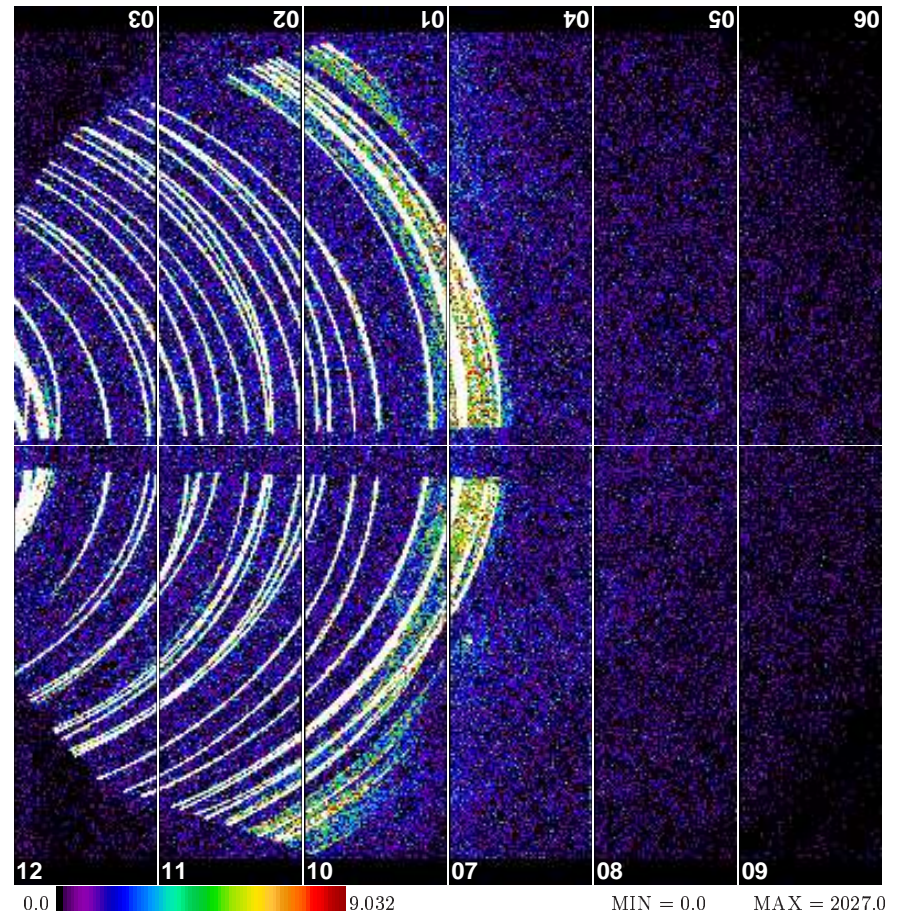
XMM-Newton XRT+EPIC straylight: **overview**



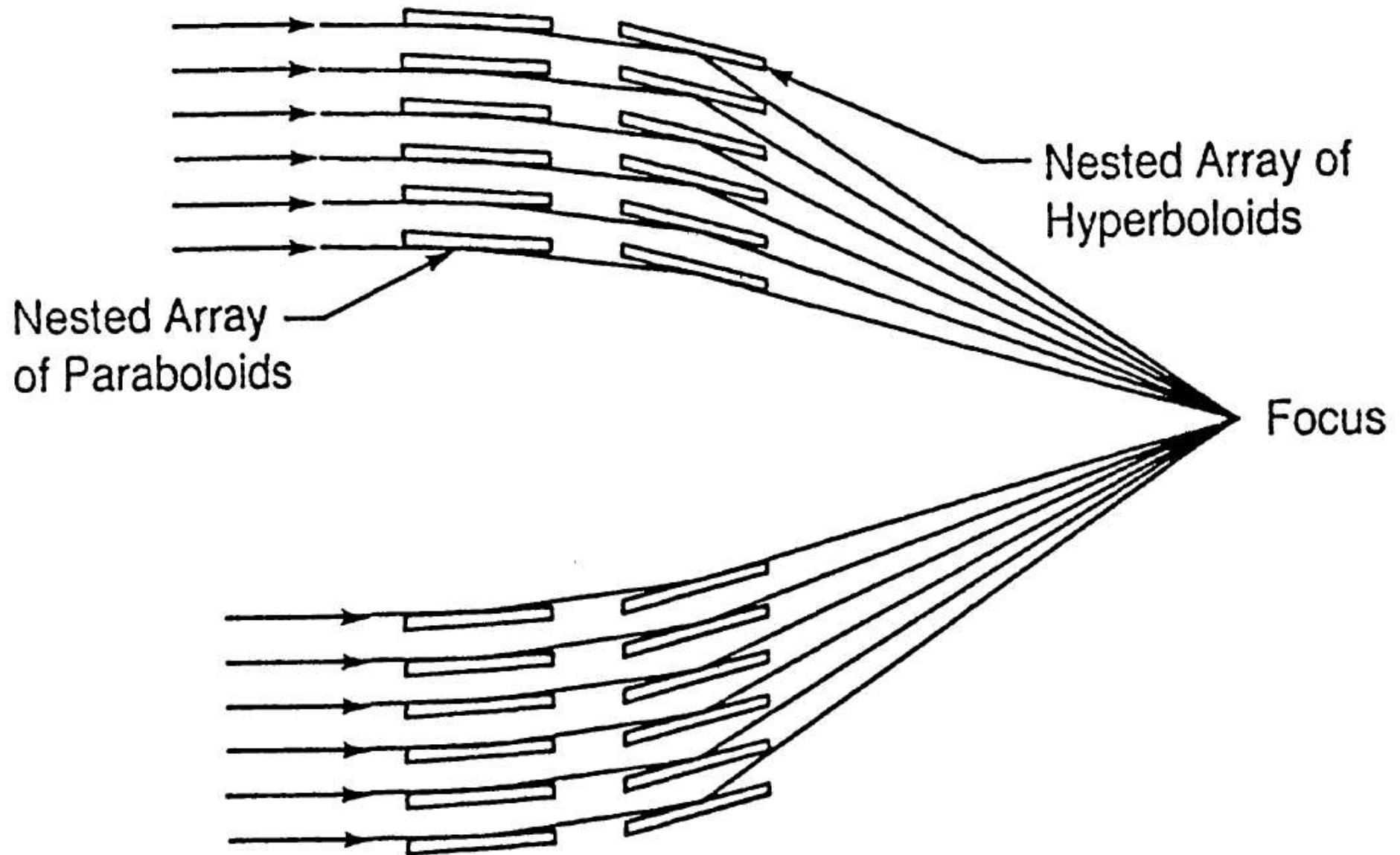
Sco X-1 large offset
 0592_0153950901_PNS016
 Singles, 0.50 – 2.00 keV

2003-03-04T06:33:08
 2003-03-04T07:48:24
 4516 s

Mode = PrimeFullWindow Filter = Thin1
 $\alpha_{2000} = 16\ 22\ 36.2$ $\delta_{2000} = -15\ 43\ 51.4$ PA = 101.366°
 $l = 359.469^\circ$ $b = 23.229^\circ$ $N_{\text{H,gal}} = 16.49 \times 10^{20} \text{ cm}^{-2}$



Wolter type-I grazing incidence X-ray optics



from: Ramsay et al., Sp.Sci.Rev. 69 (1994)

XRT straylight items

- single reflections from parabola: shells too close
- single reflections from hyperbola: typical
- reflections from backside of mirror shell: –

- out-of-FOV → out-of-window: EPIC-pn LW mode
- out-of-time events of “bad” source: EPIC-pn rows 1 – 12
- optical photons: loading, no X-ray counterpart

- X-ray baffle reduces straylight by factor of 5 – 10

EPIC: single reflections: Sco X-1

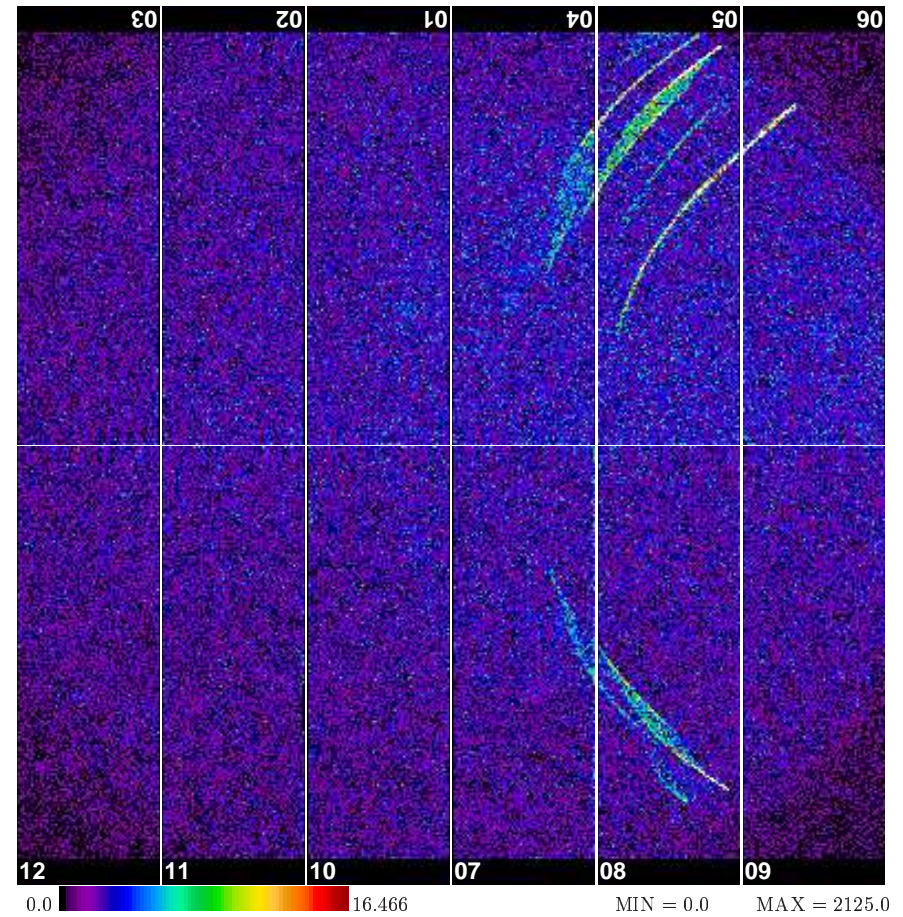
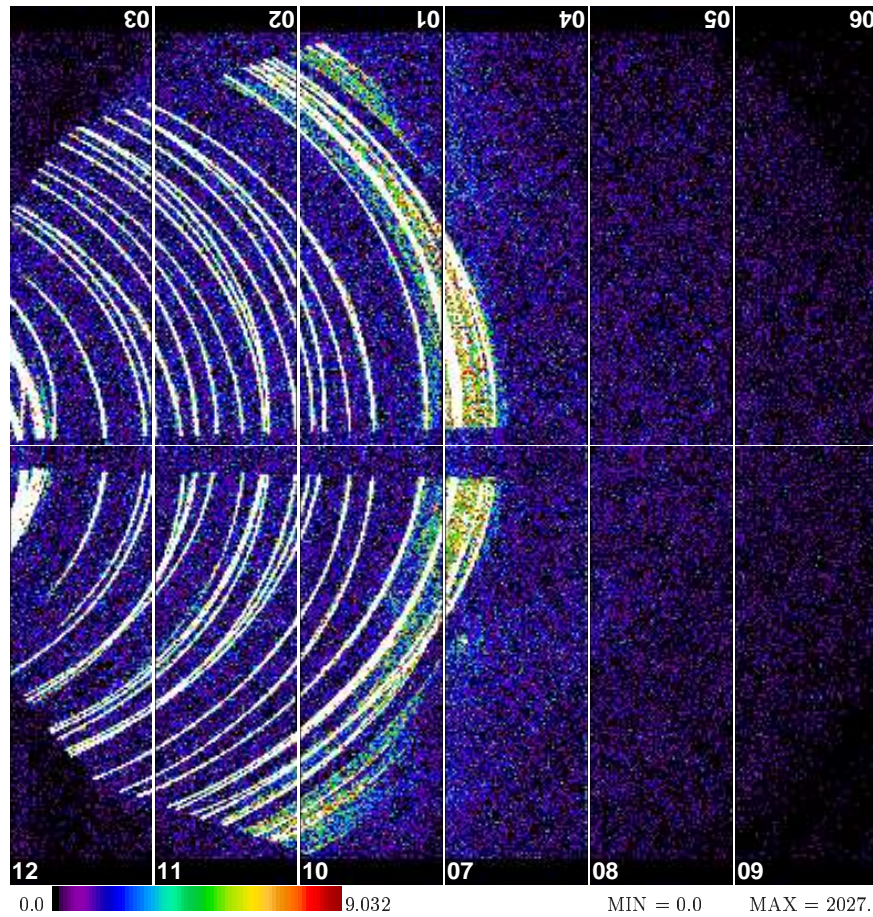
Sco X-1 large offset
0592_0153950901_PNS016
Singles, 0.50 – 2.00 keV

Mode = PrimeFullWindow Filter = Thin1
 $\alpha_{2000} = 16\ 22\ 36.2$ $\delta_{2000} = -15\ 43\ 51.4$ PA = 101.366°
 $l = 359.469^\circ$ $b = 23.229^\circ$ $N_{H,gal} = 16.49 \times 10^{20} \text{ cm}^{-2}$

2003-03-04T06:33:08 Sco X-1 large offset
2003-03-04T07:48:24 0688_0153951001_PNS016
4516 s Singles, 0.50 – 2.00 keV

Mode = PrimeFullWindow Filter = Thin1
 $\alpha_{2000} = 16\ 22\ 42.8$ $\delta_{2000} = -15\ 46\ 56.5$ PA = 281.351°
 $l = 359.444^\circ$ $b = 23.176^\circ$ $N_{H,gal} = 14.99 \times 10^{20} \text{ cm}^{-2}$

2003-09-12T11:47:13
2003-09-12T14:04:26
8233 s



Sco X-1: off-axis: 40', different roll-angle

EPIC: single reflections: Crab

Crab (off-axis 1)

0054_0121910101_PNS003

Singles, 0.50 – 2.00 keV

Mode = PrimeFullWindow Filter = Medium
 $\alpha_{2000} = 05\ 34\ 24.2$ $\delta_{2000} = +23\ 11\ 23.6$ PA = 269.221°
 $l = 183.546^\circ$ $b = -5.179^\circ$ $N_{H,gal} = 46.12 \times 10^{21} \text{ cm}^{-2}$

2000-03-26T08:13:13 Crab (off-axis 2)

2000-03-26T09:06:44 0054_0121910201_PNS003

3211 s Singles, 0.50 – 2.00 keV

Mode = PrimeFullWindow Filter = Medium
 $\alpha_{2000} = 05\ 34\ 31.2$ $\delta_{2000} = +22\ 29\ 24.0$ PA = 269.382°
 $l = 184.153^\circ$ $b = -5.532^\circ$ $N_{H,gal} = 36.5 \times 10^{21} \text{ cm}^{-2}$

2000-03-26T11:49:27 Crab (off-axis 3)

2000-03-26T12:42:58 0056_0122330301_PNS003

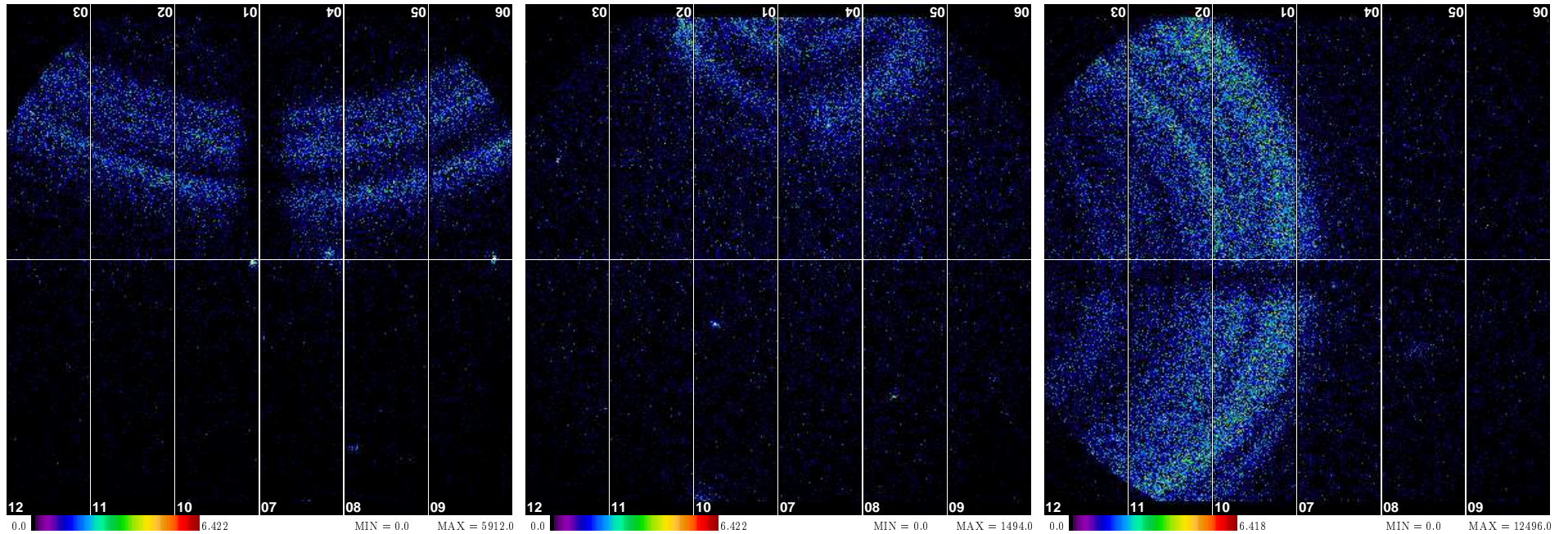
3211 s Singles, 0.50 – 2.00 keV

Mode = PrimeFullWindow Filter = Medium
 $\alpha_{2000} = 05\ 31\ 22.2$ $\delta_{2000} = +21\ 57\ 33.1$ PA = 269.281°
 $l = 184.209^\circ$ $b = -6.432^\circ$ $N_{H,gal} = 36.5 \times 10^{21} \text{ cm}^{-2}$

2000-03-30T09:33:20

2000-03-30T10:26:49

3209 s



Crab: off-axis: 70', 28', 45', extended object

EPIC: single reflections: LW mode

IGR J18029-2016

0792_0206380601_PNS003

Singles, no MIPs, 40 – 1600 adu

Mode = PrimeLargeWindow Filter = Medium
 $\alpha_{2000} = 18\ 02\ 44.9$ $\delta_{2000} = -20\ 13\ 24.9$ PA = 88.812°
 $l = 9.483^\circ$ $b = 1.058^\circ$ $N_{H,gal} = 101.81 \times 10^{20} \text{ cm}^{-2}$

2004-04-06T06:54:40 GRS 1758-258

2004-04-06T09:44:38 0235_0136140201_PNS001

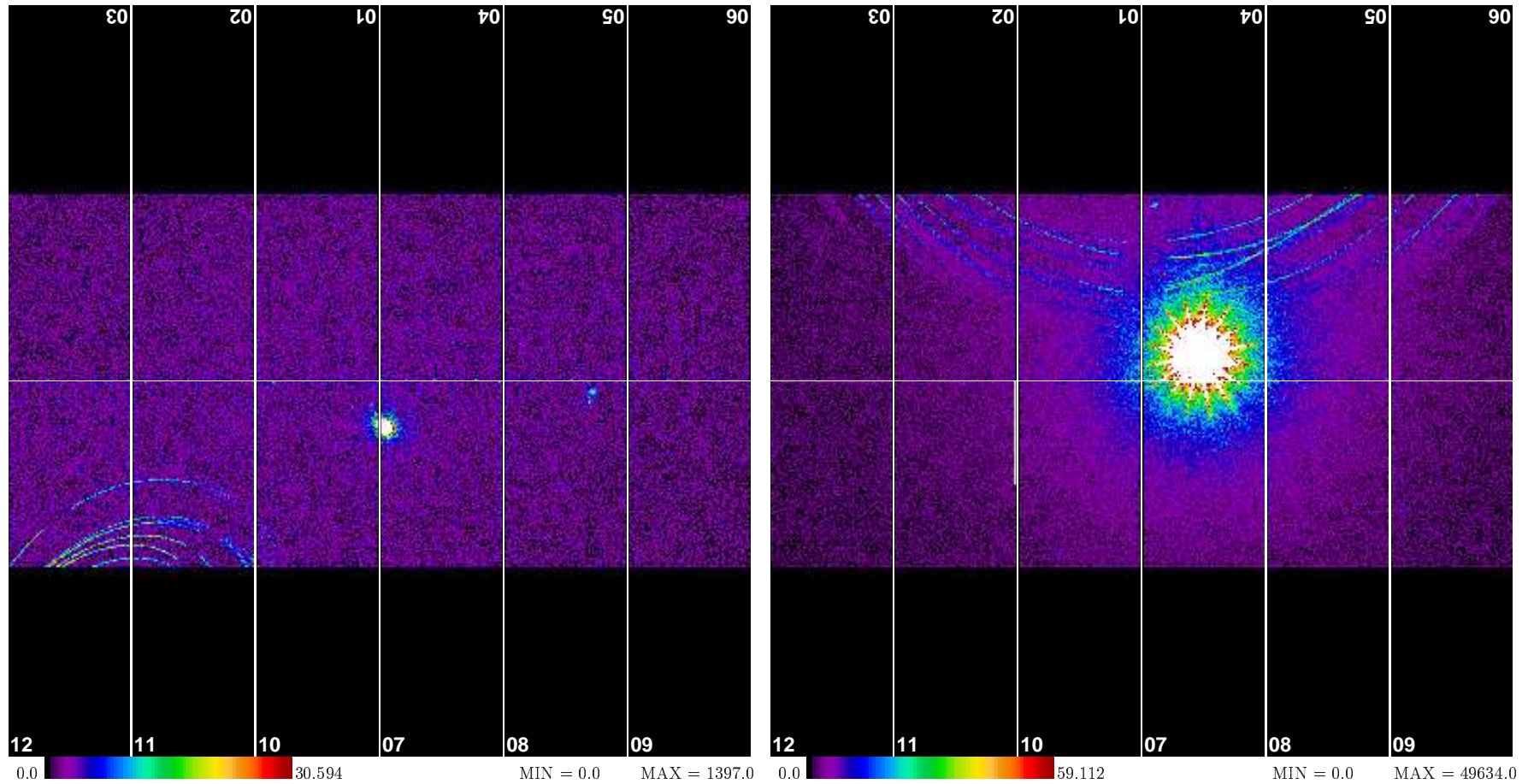
10198 s Singles, no MIPs, 40 – 1600 adu

Mode = PrimeLargeWindow Filter = Thin1
 $\alpha_{2000} = 18\ 01\ 7.9$ $\delta_{2000} = -25\ 43\ 19.8$ PA = 91.261°
 $l = 4.519^\circ$ $b = -1.336^\circ$ $N_{H,gal} = 92.58 \times 10^{20} \text{ cm}^{-2}$

2001-03-22T10:21:37

2001-03-22T15:50:01

19704 s



GX 9+1 (25'), GX 5-1 (39')

EPIC: single reflections: GX 5-1

PSR B1757-24
0415_0103261901_PNS003
Singles, 0.50 – 2.00 keV

Mode = PrimeFullWindow Filter = Medium
 $\alpha_{2000} = 180056.2$ $\delta_{2000} = -24502.8$ PA = 89.791°
 $l = 5.269^\circ$ $b = -0.858^\circ$ $N_{H,gal} = 92.58 \times 10^{21} \text{ cm}^{-2}$

2002-03-16T21:26:28 HD164794
2002-03-16T22:51:09 0228_0008820101_PNU002

5081 s Singles, no MIPs, 40 – 1600 adu

Mode = PrimeFullWindow Filter = Thick
 $\alpha_{2000} = 180348.0$ $\delta_{2000} = -24209.9$ PA = 91.135°
 $l = 6.023^\circ$ $b = -1.178^\circ$ $N_{H,gal} = 86.26 \times 10^{21} \text{ cm}^{-2}$

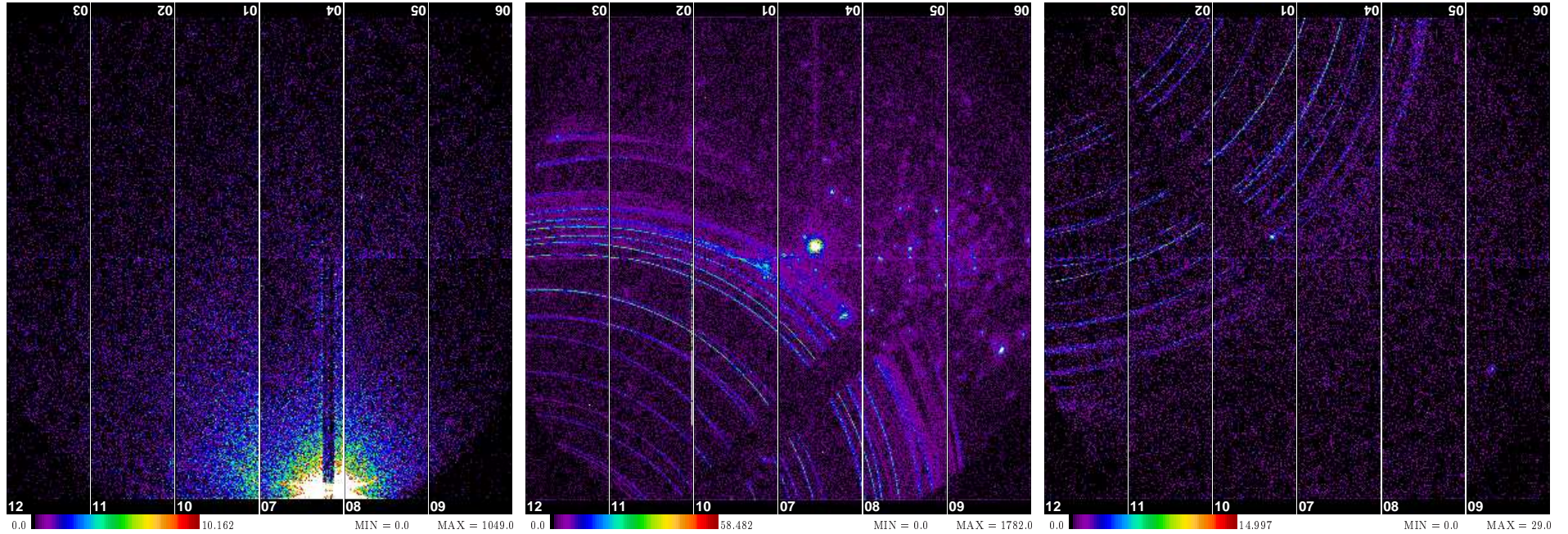
2001-03-08T12:17:05 PSR J1757-2421
2001-03-08T17:41:59 0504_0112201501_PNS001

19494 s Singles, no MIPs, 40 – 1600 adu

Mode = PrimeFullWindow Filter = Medium
 $\alpha_{2000} = 175745.3$ $\delta_{2000} = -242323.7$ PA = 270.034°
 $l = 5.294^\circ$ $b = -0.009^\circ$ $N_{H,gal} = 152.72 \times 10^{21} \text{ cm}^{-2}$

2002-09-09T20:23:05
2002-09-09T21:46:24

4999 s



GX 5-1: 13.8', 57', 63'

EPIC: single reflections: LMC X-1

First Light

0021_0115690201_PNU015

Singles, no MIPs, 40 – 1600 adu

Mode = PrimeFullWindow Filter = Medium
 $\alpha_{2000} = 05\ 36\ 57.0$ $\delta_{2000} = -69\ 13\ 46.9$ PA = -147.099°
 $l = 279.638^\circ$ $b = -31.812^\circ$ $N_{H,gal} = 6.24 \times 10^{20} \text{ cm}^{-2}$

2000-01-19T17:30:04 N LMC 1995

2000-01-20T04:24:59 0189_0086770101_PNS002

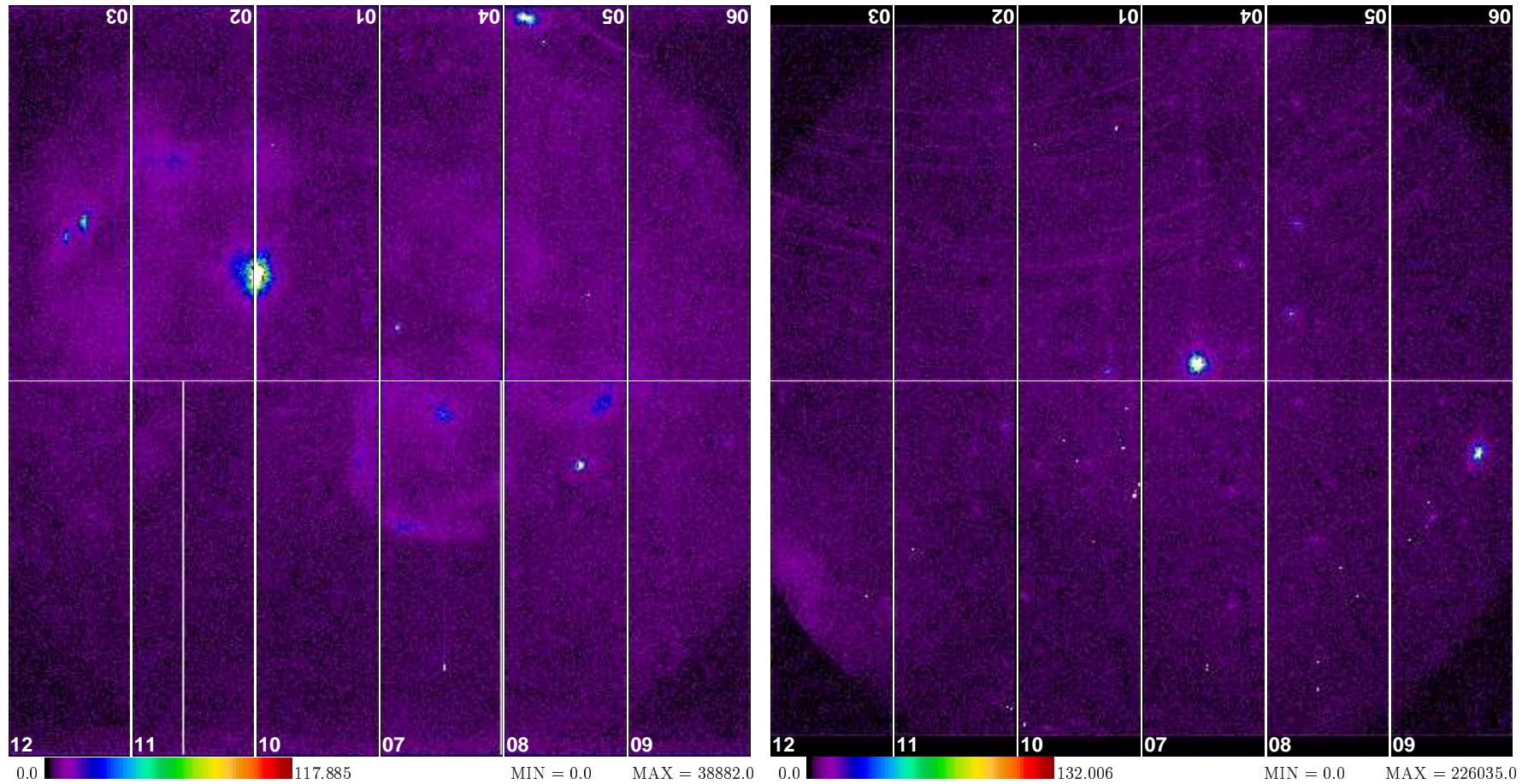
39295 s Singles, no MIPs, 40 – 1600 adu

Mode = PrimeFullWindow Filter = Thin1
 $\alpha_{2000} = 05\ 27\ 9.0$ $\delta_{2000} = -70\ 00\ 32.8$ PA = 186.051°
 $l = 280.697^\circ$ $b = -32.541^\circ$ $N_{H,gal} = 6.22 \times 10^{20} \text{ cm}^{-2}$

2000-12-19T17:32:38

2000-12-20T05:46:00

44002 s



LMC X-1: source in rows 1 – 12, 67'

EPIC: single reflections: N132D + LMC X-1

N132D

0991_0137551301_PNS001

Singles, 0.50 – 2.00 keV

Mode = PrimeLargeWindow Filter = Thin1
 $\alpha_{2000} = 05\ 25\ 34.8$ $\delta_{2000} = -69\ 38\ 27.0$ PA = 325.747°
 $l = 280.294^\circ$ $b = -32.738^\circ$ $N_{H,gal} = 6.22 \times 10^{20} \text{ cm}^{-2}$

2005-05-07T12:53:13 N132D

2005-05-07T15:39:57 0991_0137551401_PNS001

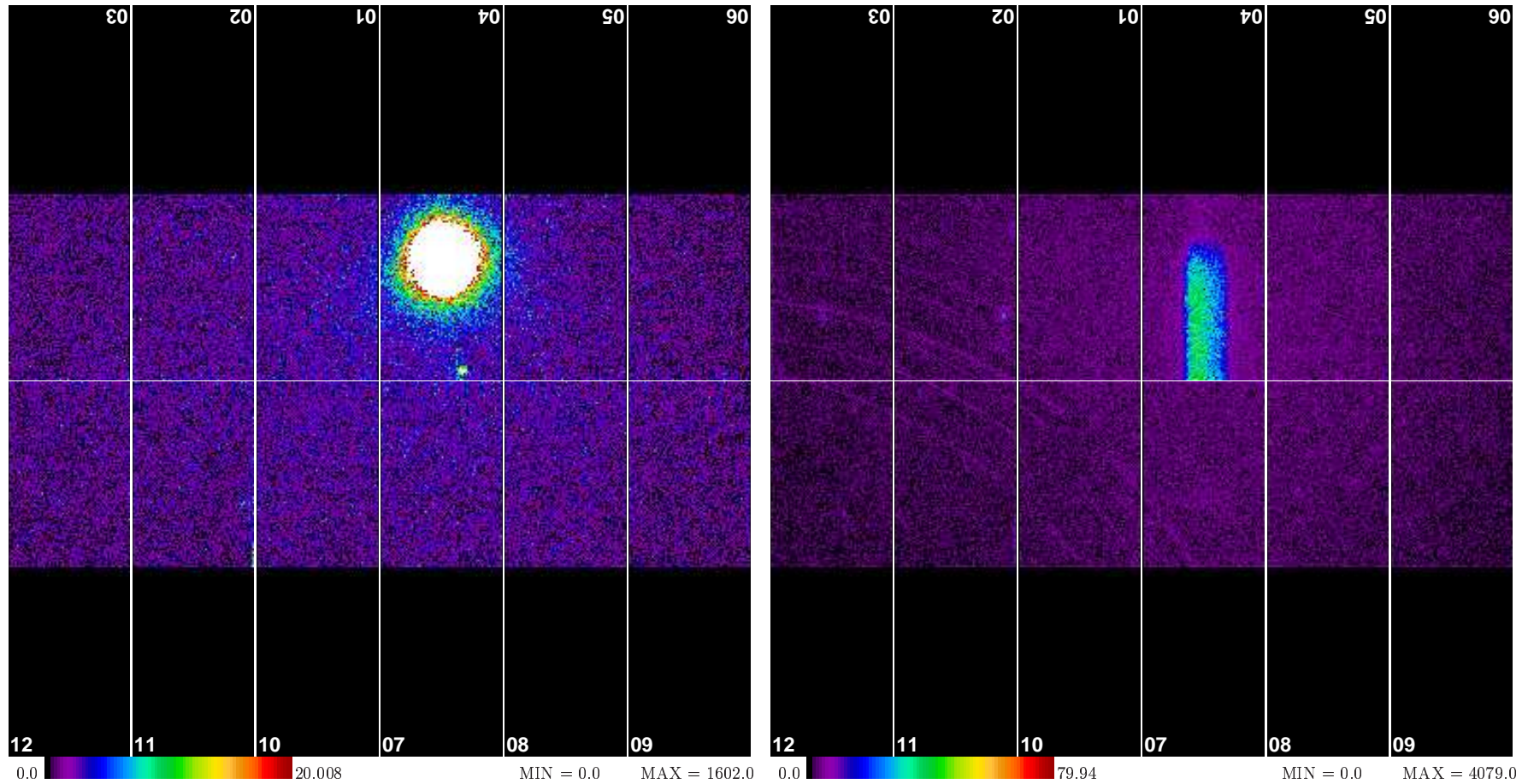
10004 s Singles, 0.50 – 2.00 keV

Mode = PrimeLargeWindow Filter = Thin1
 $\alpha_{2000} = 05\ 26\ 40.7$ $\delta_{2000} = -69\ 34\ 31.5$ PA = 325.737°
 $l = 280.198^\circ$ $b = -32.655^\circ$ $N_{H,gal} = 6.22 \times 10^{20} \text{ cm}^{-2}$

2005-05-07T16:55:23

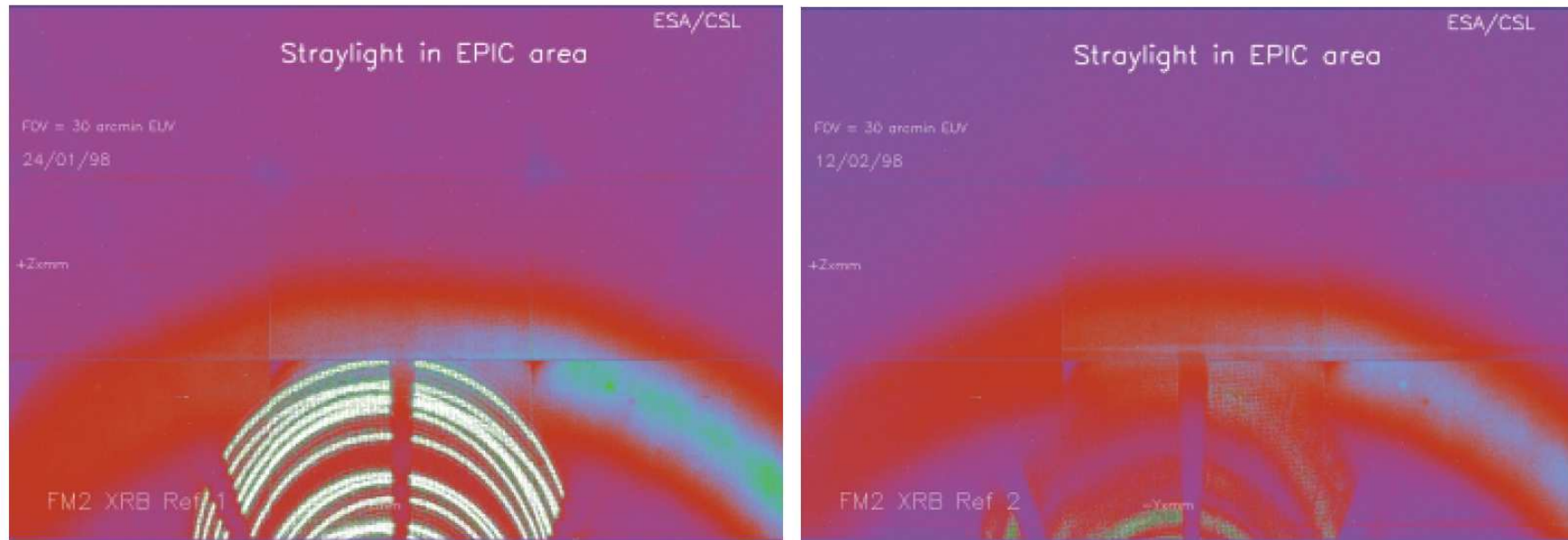
2005-05-08T04:01:33

39970 s



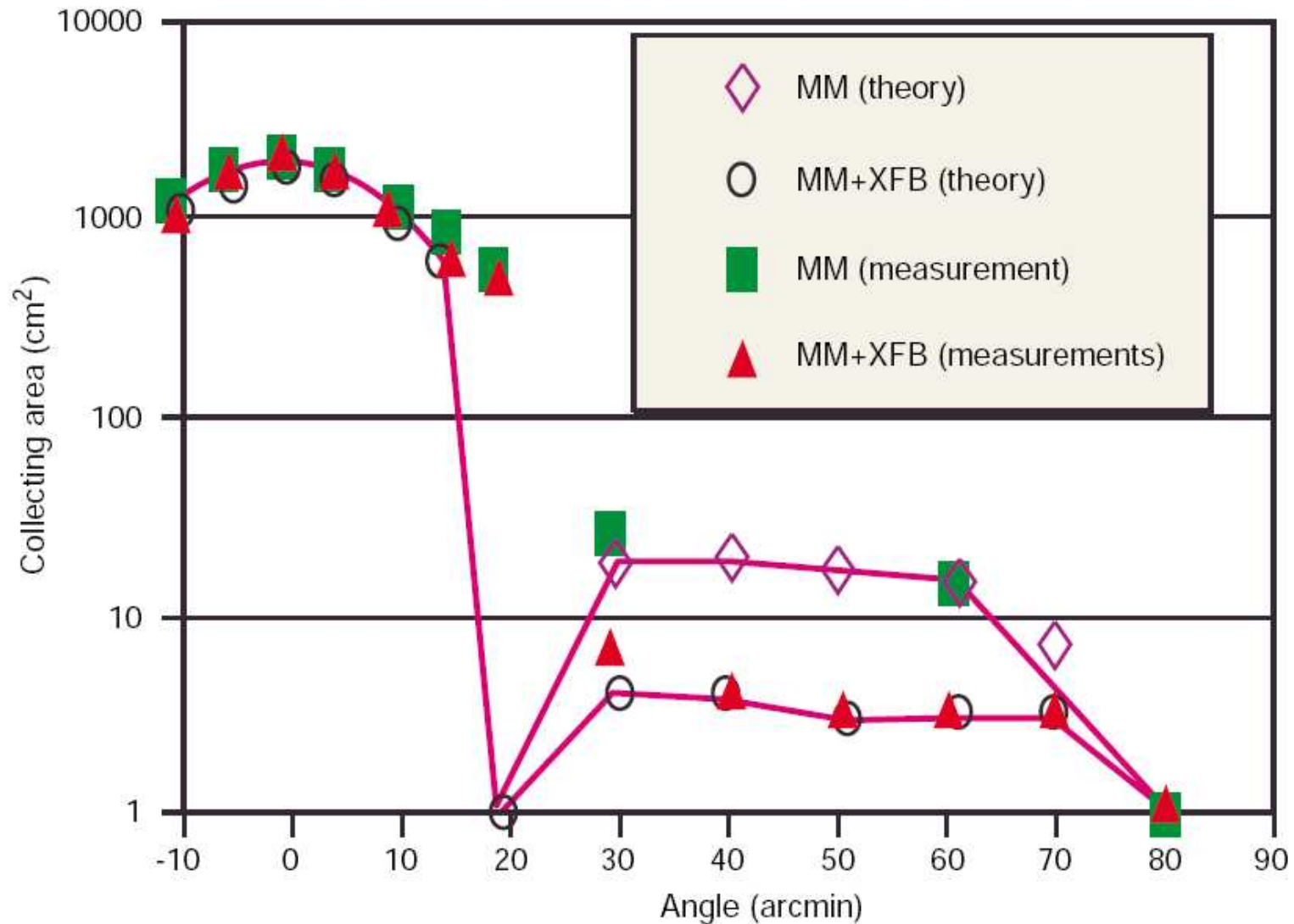
N132D out-of-window, LMC X-1: 74', 69'

XRT: X-ray baffle: reduction (CSL)



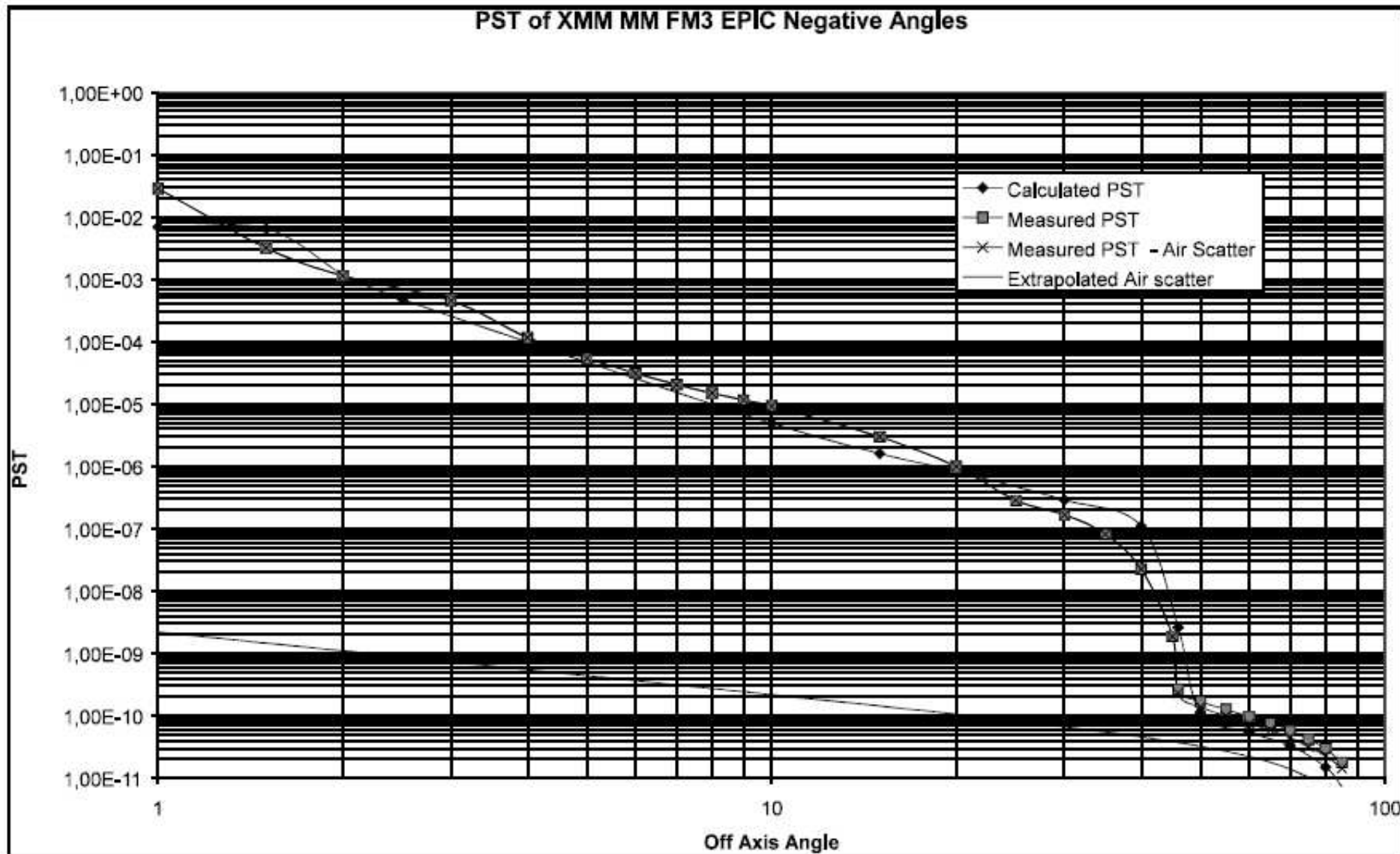
from: de Chambure et al., ESA bulletin 100 (Dec.1999), Fig.12

XRT: X-ray baffle: reduction (FM3)



from: de Chambure et al., ESA bulletin 100 (Dec.1999), Fig.13
3 cm² between 20' and 80', UHB Sect. 3.2.4, no CCF ?

XRT: very-far-field (FM3)



from: XMM-SOC-CAL-RP-0002 (Dornier XM-TR-DOR-0178)