Data :	GRS1758-258	Thin filters	
	MOS 1 & 2 in Small Window	~ 22 cts/s	~ 6.6 cts/frame
	PN in Large Window	~ 52 cts/s	~ 2.5 cts/frame

Episode 1 : June 2001 meeting (Leicester)

« Spectral and spatial deformations on piled-up sources, "a one case study, of MOS data" »

Big problems in spectral results as a function of extraction radius

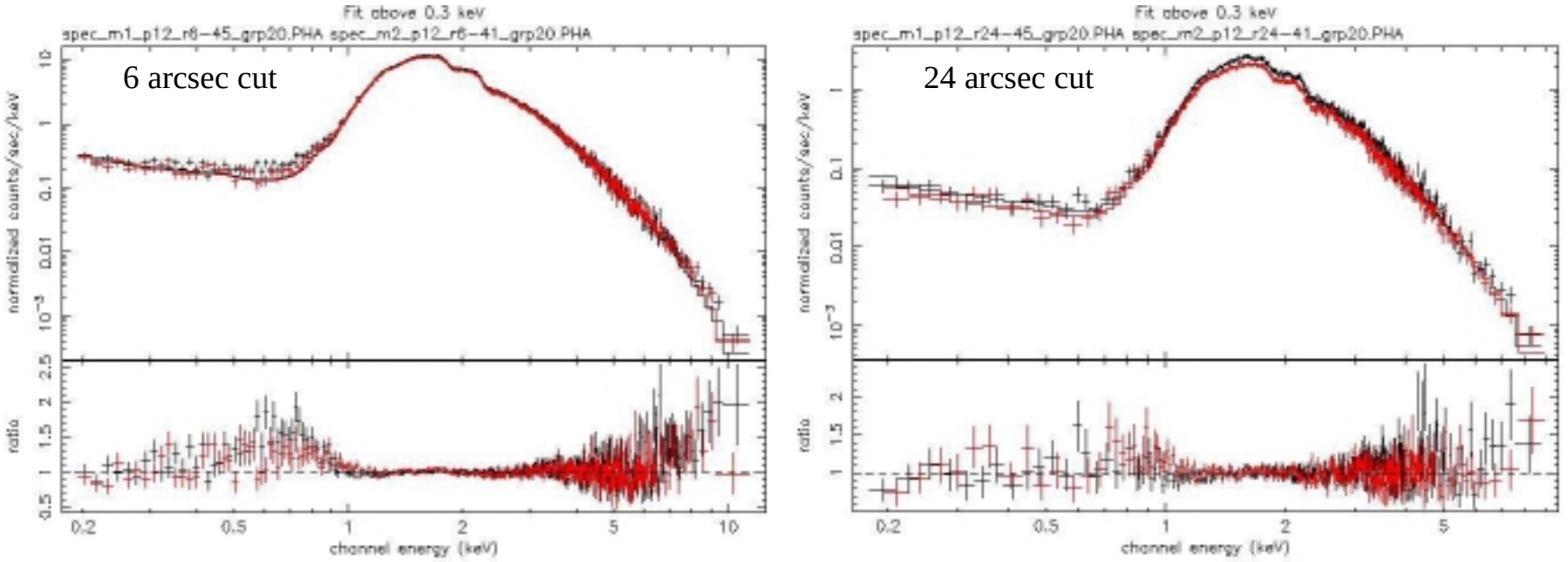
Episode 2 : November 2001 meeting (Milano)

« Checking encircled energy by spectral fitting »

Big problems solved thanks to new PSF : spectral results independent of extraction radius.

but strong MOS excess at low and high energy

MOS excess at low and high energy



Is this an effect of bad background correction ?

Episode 3

Re-analysis of the GRS1758 piled-up source :
all problems remain...

Analysis plan :

- take the latest emchain processing : developper SAS end of January
- stick to one exclusion radius : 6 arcsec for MOS
  source region : [6–45] arcsec MOS1, [6–41] arcsec MOS2
- use the latest matrices (q20 here)
- use the CCF corrections for the Encircled Energy
- background : from annulus [8.4–12] arc min (MOS2)

- since background far away from source region : separate the particle background correction (non vignetted, but with spatial dependence) and the diffuse background correction (vignetted).

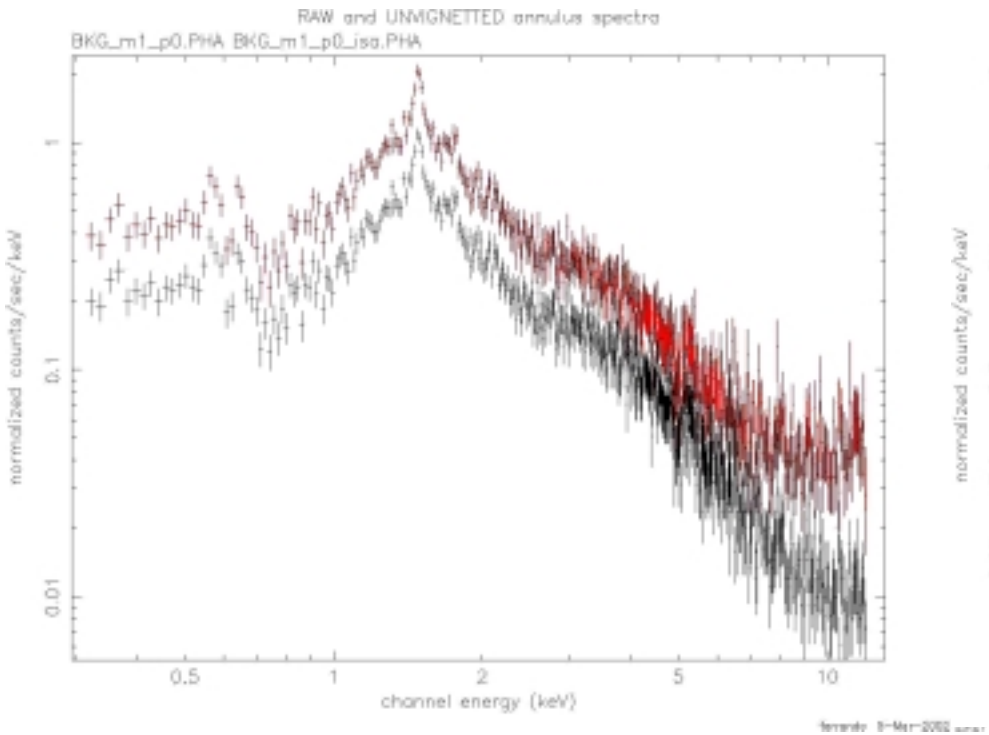
Problem equations for « double background substraction »

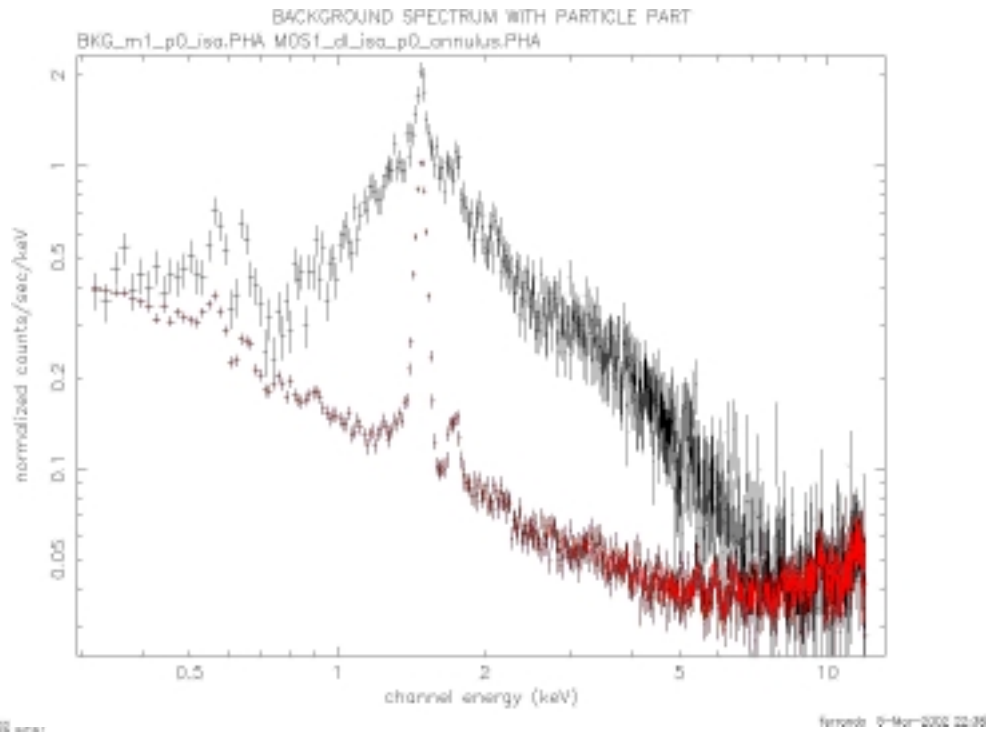
Source spectrum = Raw spectrum – source region diffuse bkgd
– source region particle bkgd

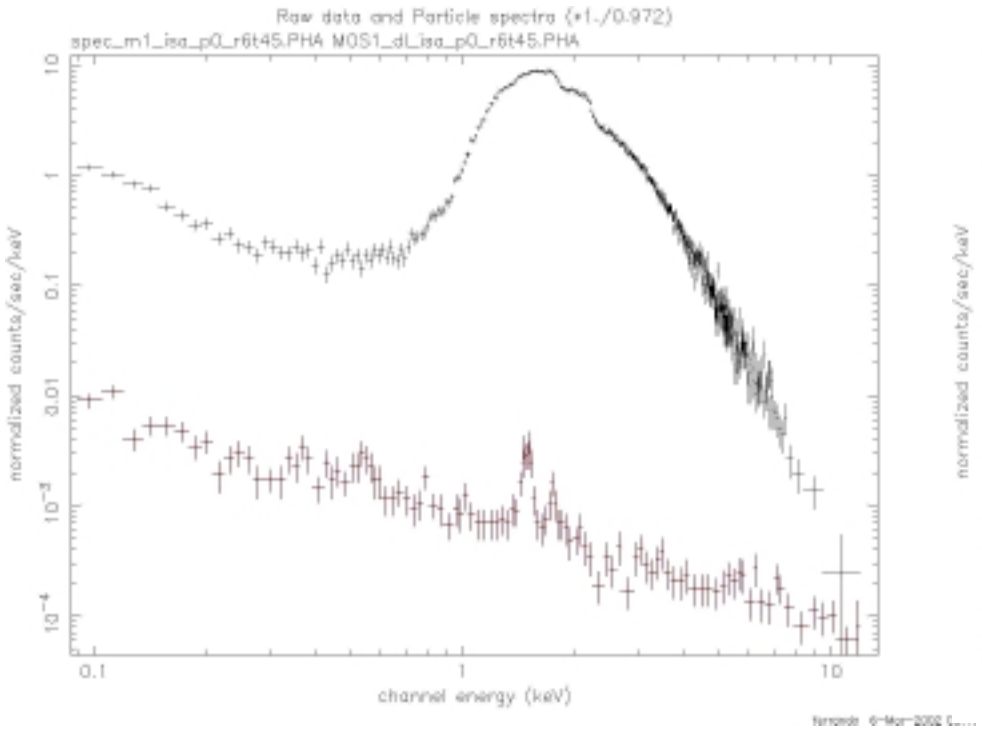
source region diffuse bkgd = annulus diffuse bkgd corrected for vignetting

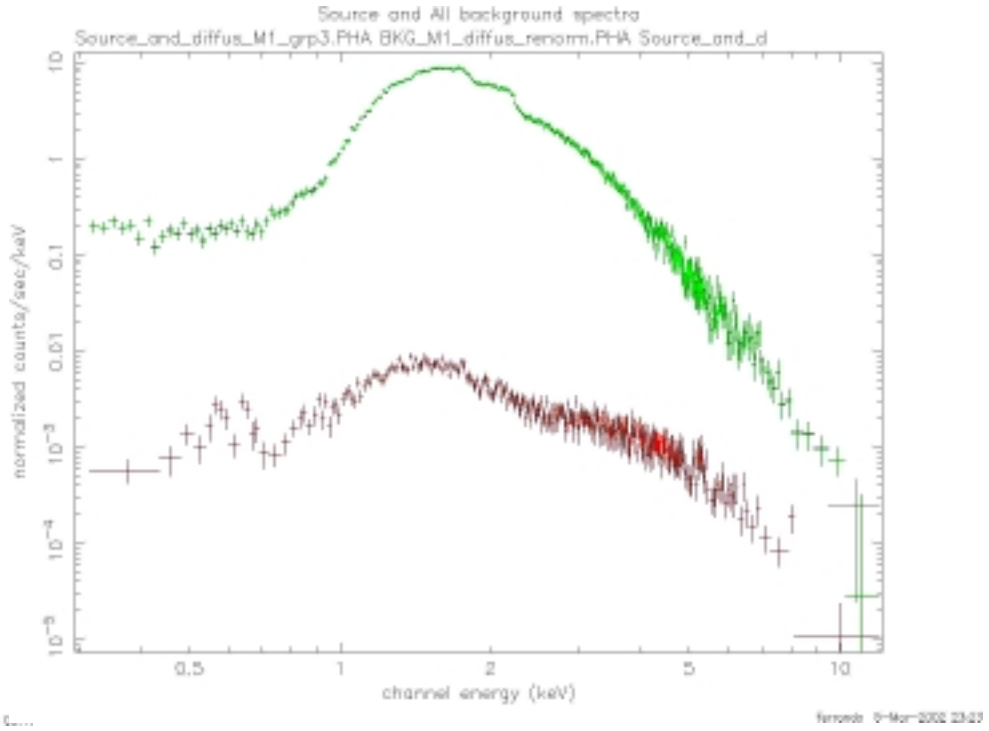
- annulus diffuse bkgd = RAW annulus spectrum – annulus particle bkgd
- annulus particle bkdg = “Lumb” background in annulus region × NORM
- NORM = Raw annulus spectrum [10–12 keV] / “Lumb” bkgd [10–12 keV]

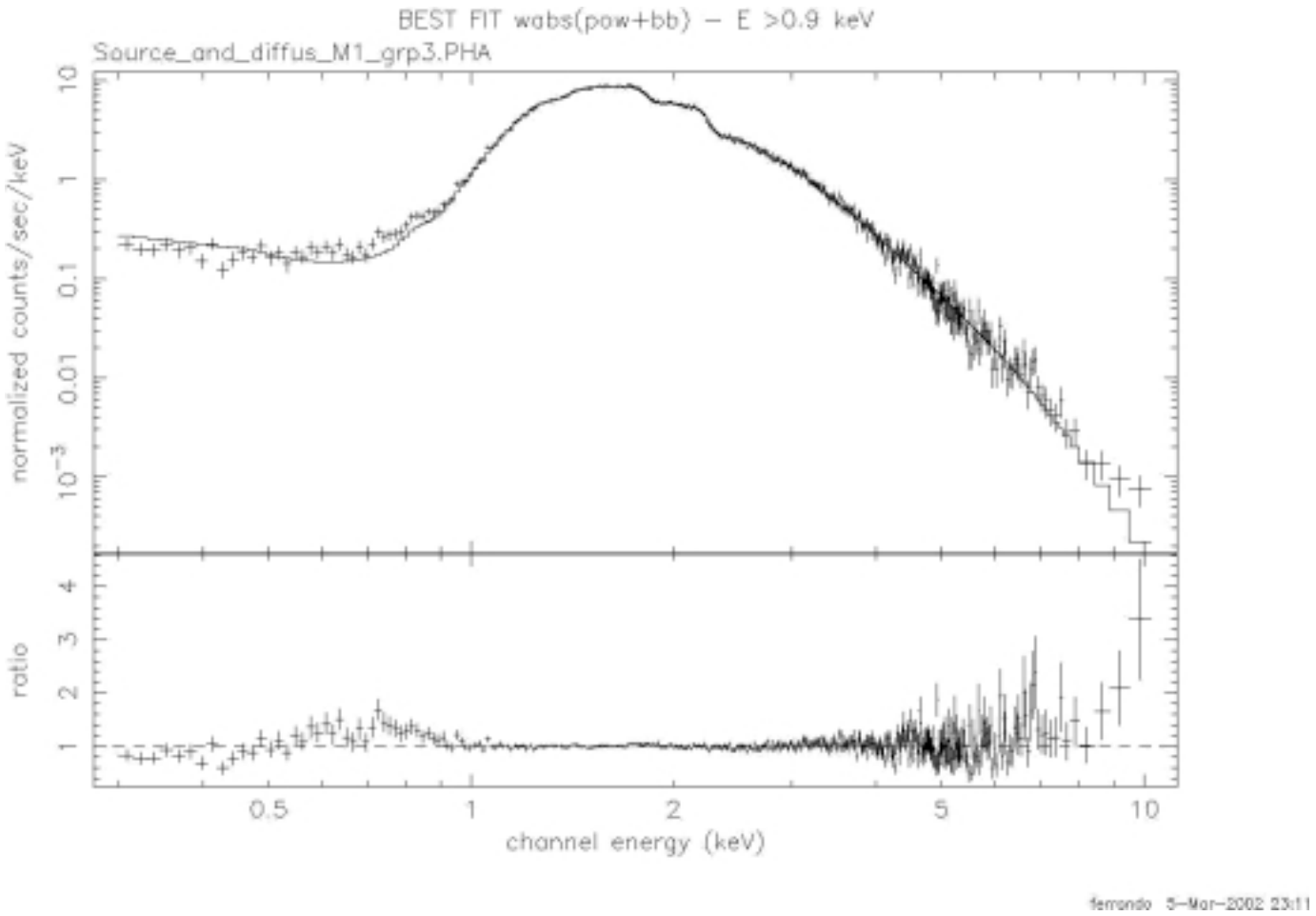
source region particle bkgd = “Lumb background” in source region × NORM


RAW and UNVIGNETTED annulus spectra
BKG_m1_p0.PHA BKG_m1_p0_isa.PHA
normalized counts/sec/keV
channel energy (keV)


BACKGROUND SPECTRUM WITH PARTICLE PART
BKG_m1_p0_isa.PHA M0S1_cl_isa_p0_annulus.PHA
normalized counts/sec/keV
channel energy (keV)


Raw data and Particle spectra (*1./0.972)
spec_m1_isa_p0_r6t45.PHA MOS1_dl_isa_p0_r6t45.PHA
normalized counts/sec/keV
channel energy (keV)


Source and All background spectra
Source_and_diffus_M1_grp3.PHA BKG_M1_diffus_renorm.PHA Source_and_d
normalized counts/sec/keV
channel energy (keV)



Problem is not solved...

Some impact on fits however

Fitting above 0.9 keV, MOS 1 - PL + BB

Power law index : 4.18 ± 0.11 with simple annulus bkgd substraction
4.25 ± 0.11 with correct treatment

Rise of index as expected (vignetting increase of background substracted)

Conclusion of Episode 3

- Despite very careful background substraction, MOS excess at high energy remains. Causes can be :
  - i) problems with encircled energy ?
  - ii) problems with mono-pixel fraction (selected here) ?
  - iii) residual pile-up effect ?

- MOS excess in the ~ 0.5–0.9 keV range still present. Causes can be ???

- Side result of this analysis :
  - The MOS spectrum is steepened when proper vignetting effect is taken into account. Be careful if sources are in a strong diffuse emission environment.