Chapter 3

Images

Here you will extract an image and perform vignetting correction to it. The parameters for this are defined in */your_data_path*/**data/imaging.par**: (copy an example file from */your_data_path*/**scripts**). *imaging_binsize* is the number of pixels used when binning the image, *imaging_low_e* and *imaging_up_e* set the lower and upper energy channel (in eV) used to accumulate the photons. Set the keywords *imaging_PN_ratio*, *imaging_M1_ratio* and *imaging_M2_ratio* to zero.

The process is run by executing

```
run_sas gt10 imaging1
```

The software first accumulates raw images ("***raw.im**"). Then the out-of-time correction is applied to PN image ("***raw_ootcorr.im**"). Then the program creates exposure maps ("***.exp**"). Then the program applies the vignetting correction by dividing the image by the exposure map, producing the final images ("***rate.im**"). In the final files, the vignetting corrected sky background is not subtracted in order to avoid small number statistics. This should appear as a constant component in the surface brightness profile, best visible at large radii. The products are placed in a directory */your_data_path*/**data/***name/obsid/instrument*. The root of the product names is
"*_XY_{*imaging_low_e*}_{*imaging_up_e*}_{*imaging_binsize*}pix_gt10_"

You can look at the image with the ds9 - tool by typing "ds9 imagename". Use "Scale" tool option "Scale parameters" to set the lowest value to a sensible positive value (some pixels may have negative values which may upset the plot). "Scale" "log" probably gives the best visualisation of the data. Change and adjust the "color" to see the cluster emission clearly. Apply the sky coordinate grid using "Analysis" "Coordinate grid". Make a hardcopy of the plot with "File" "Save Image".