

The XMM-Newton survey in the Chandra Deep Field South

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with

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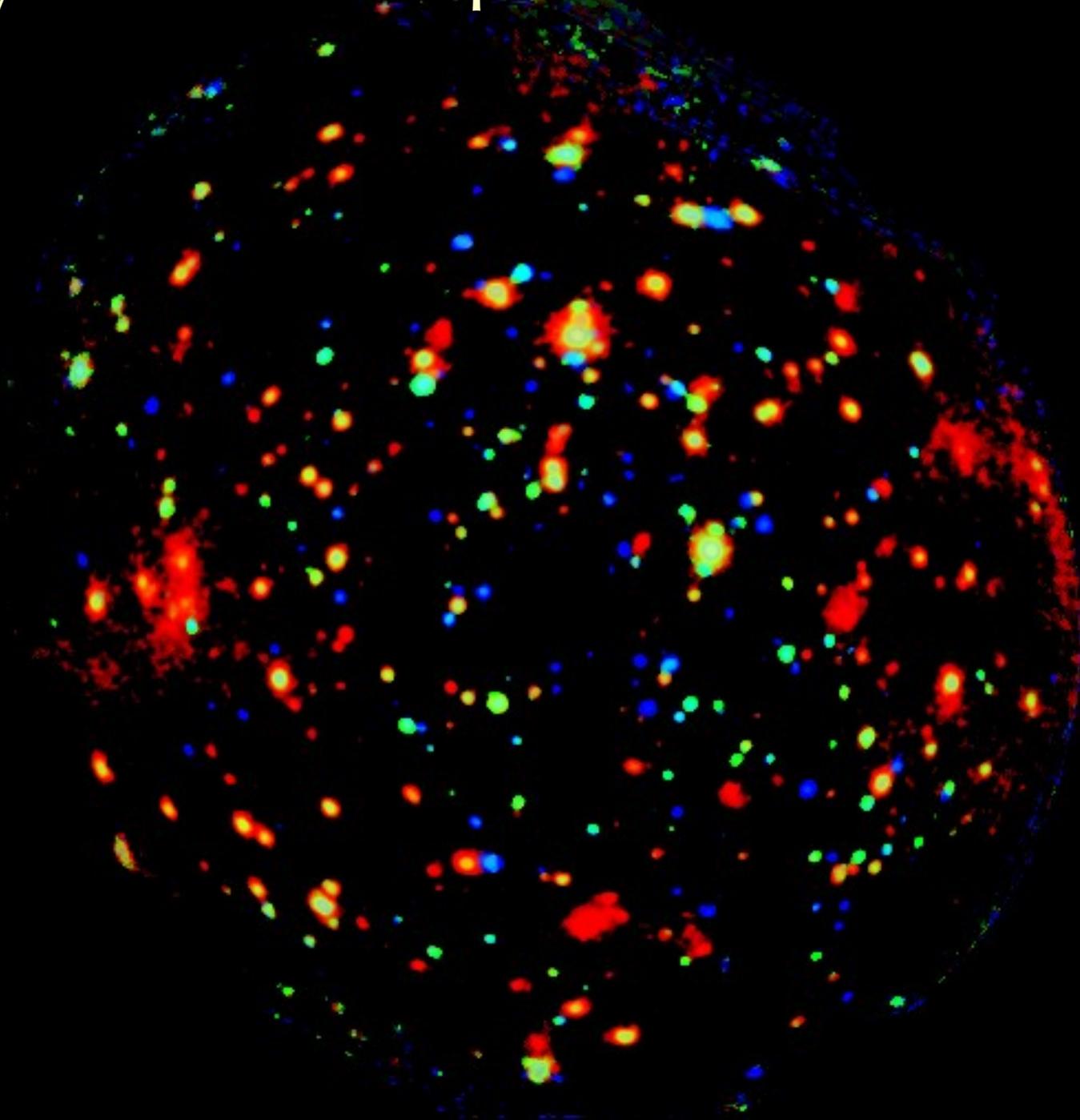
Andrea Merloni

Fabrizio Nicastro

Maurizio Paolillo

Christian Vignali

and the XMM-CDFS team.



Field: CDFS

Total exposure: 3.3 Ms

Clean exposures: 2.4 Ms (pn), 2.8 Ms (mos)

33 observations, in years 2001-2002 and 2008-2010

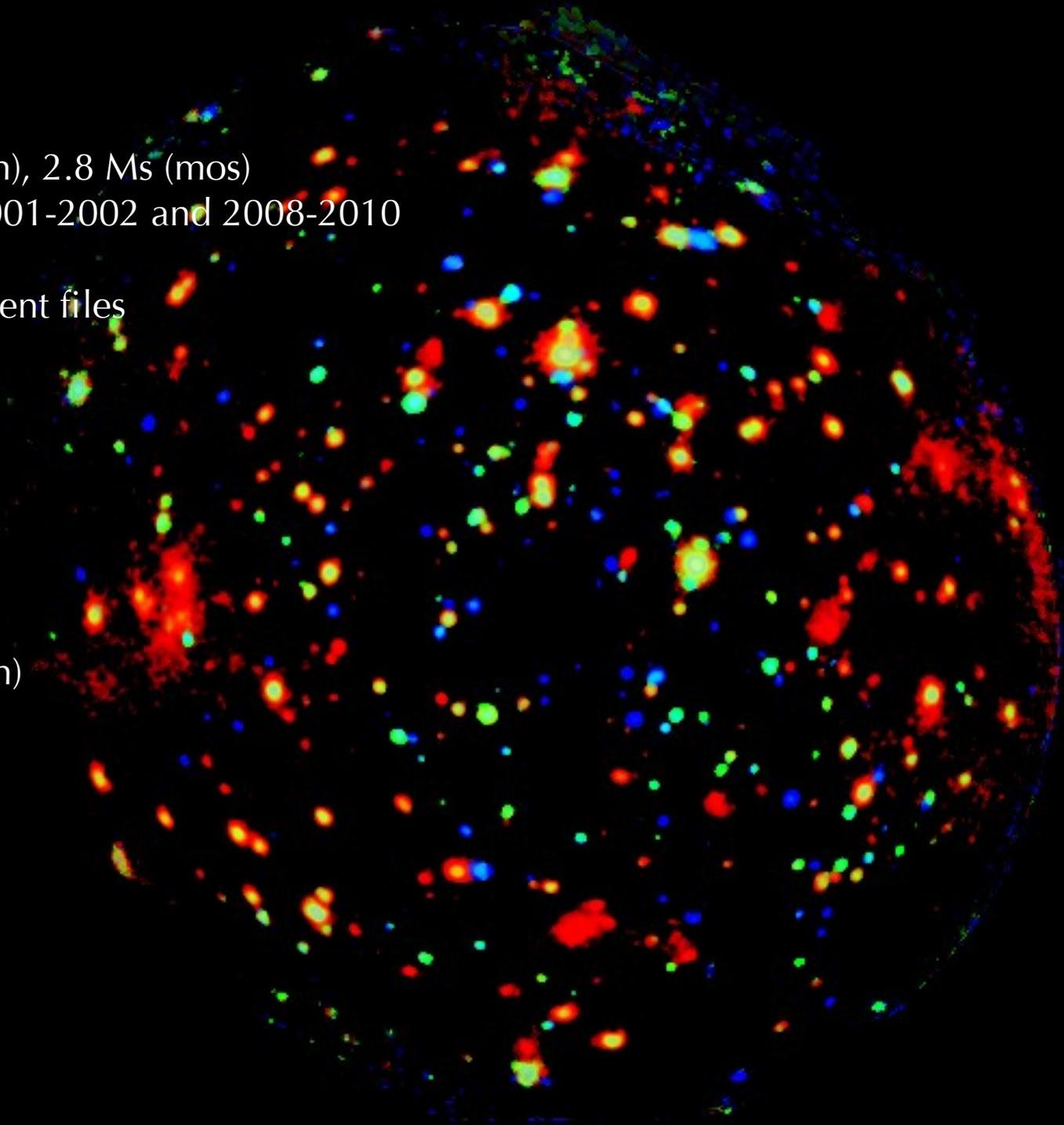
33 obs x 3 cameras = 99 event files

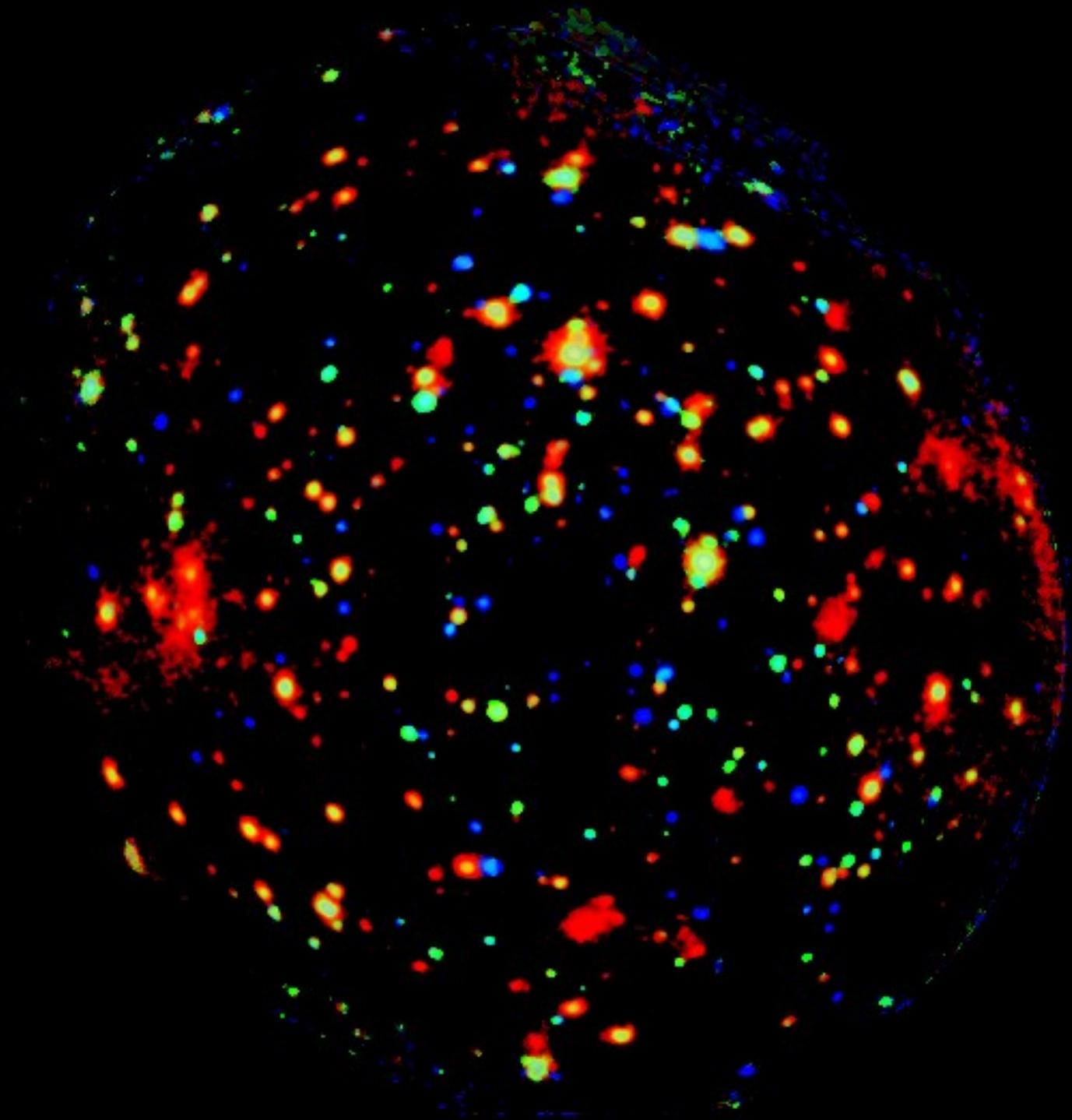
STATUS:

First paper published
(Comastri et al. 2011)

Catalogue being finalized
(Ranalli et al., in preparation)

Working on spectroscopy
of sources, stacks, etc.





Data analysis:

- lightcurve cleaning
- astrometry
- cannot merge event files, need to merge final products
- automated tools to produce images and spectra, to sum them and to average the responses

Catalogues

- 2-10 and 5-10 keV bands: 274 and 92 sources detected, respectively, at 5σ
- catalogues at lower energies and at lower thresholds are in preparation.
- completeness and the reliability to be assessed using simulations.

Simulator

- reproducing the energy- and spatially-dependent PSFs, the exposures and the backgrounds, in the fastest time
- can be easily adapted to other telescopes, e.g. Chandra or IXO

Background

- very complex dependence on the spatial positions, due to the many exposures needed to complete the survey
- very difficult to select local backgrounds for spectra extraction
- using ESAS to obtain instrumental backgrounds from *Filter Wheel Closed* observations.

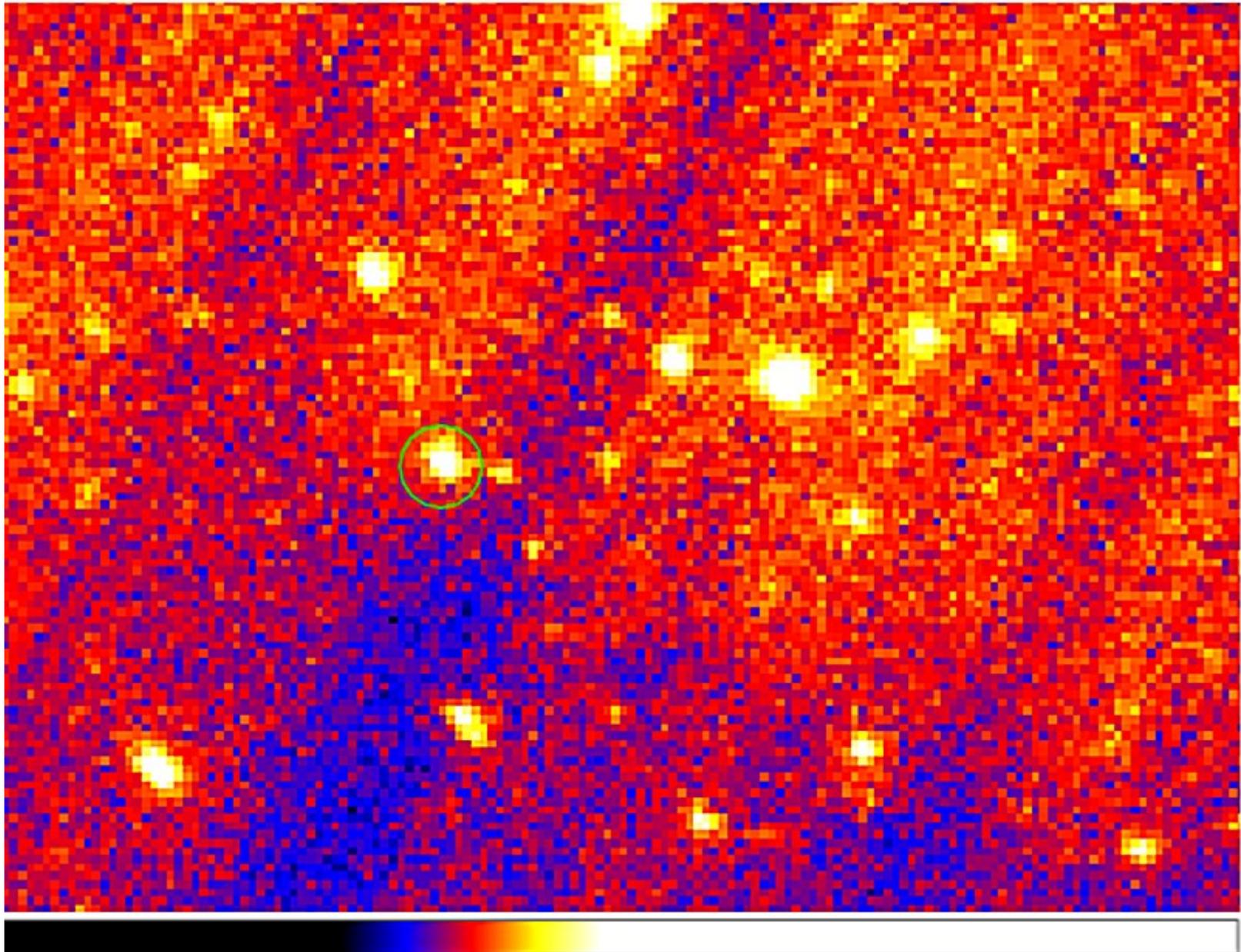
Spectra

- Good quality (> 1000 net counts mos+pn) X-ray spectra are obtained for 133 objects

Choosing background regions for spectra extraction

0.5-10 keV

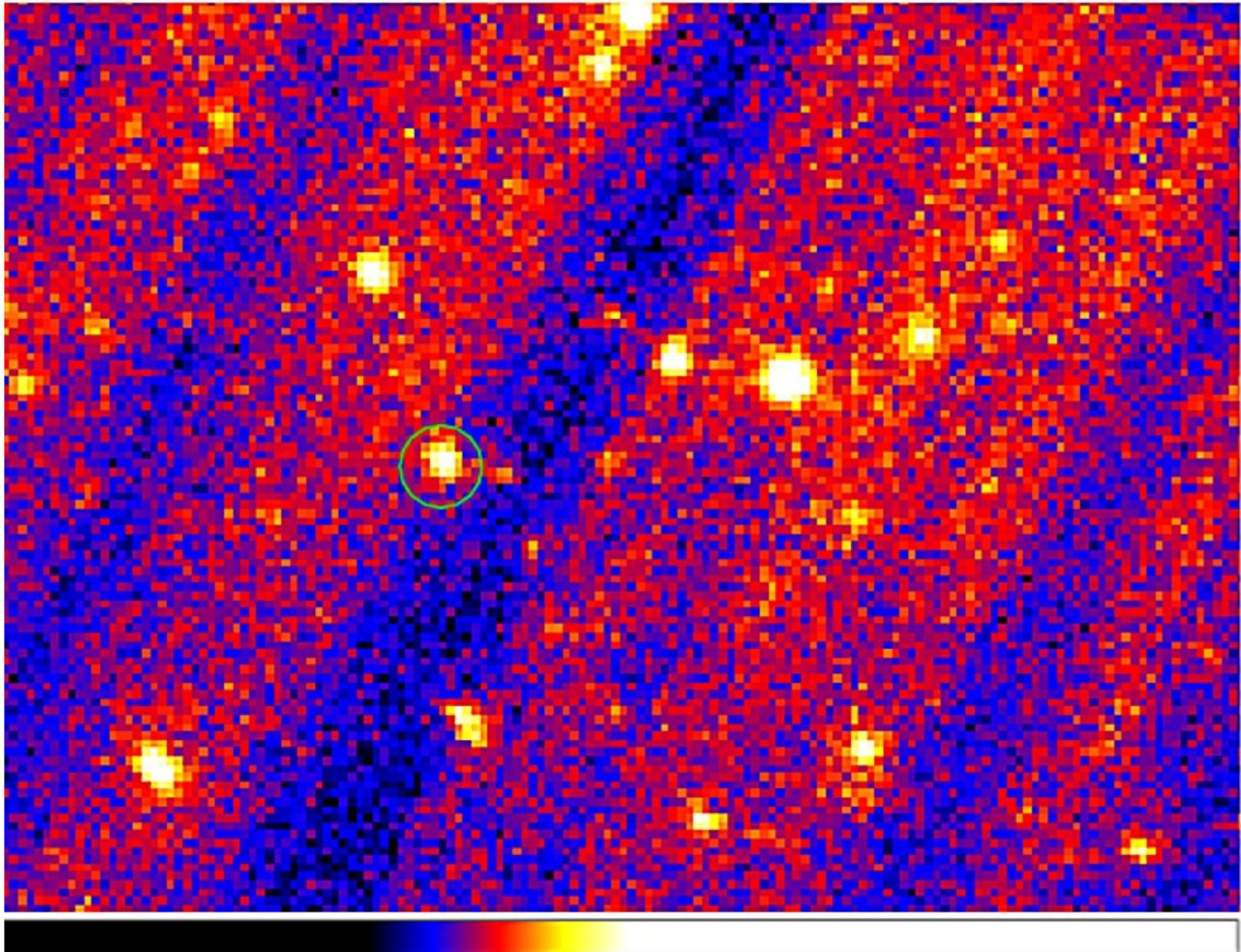
MOS+PN



Choosing background regions for spectra extraction

0.5-10 keV

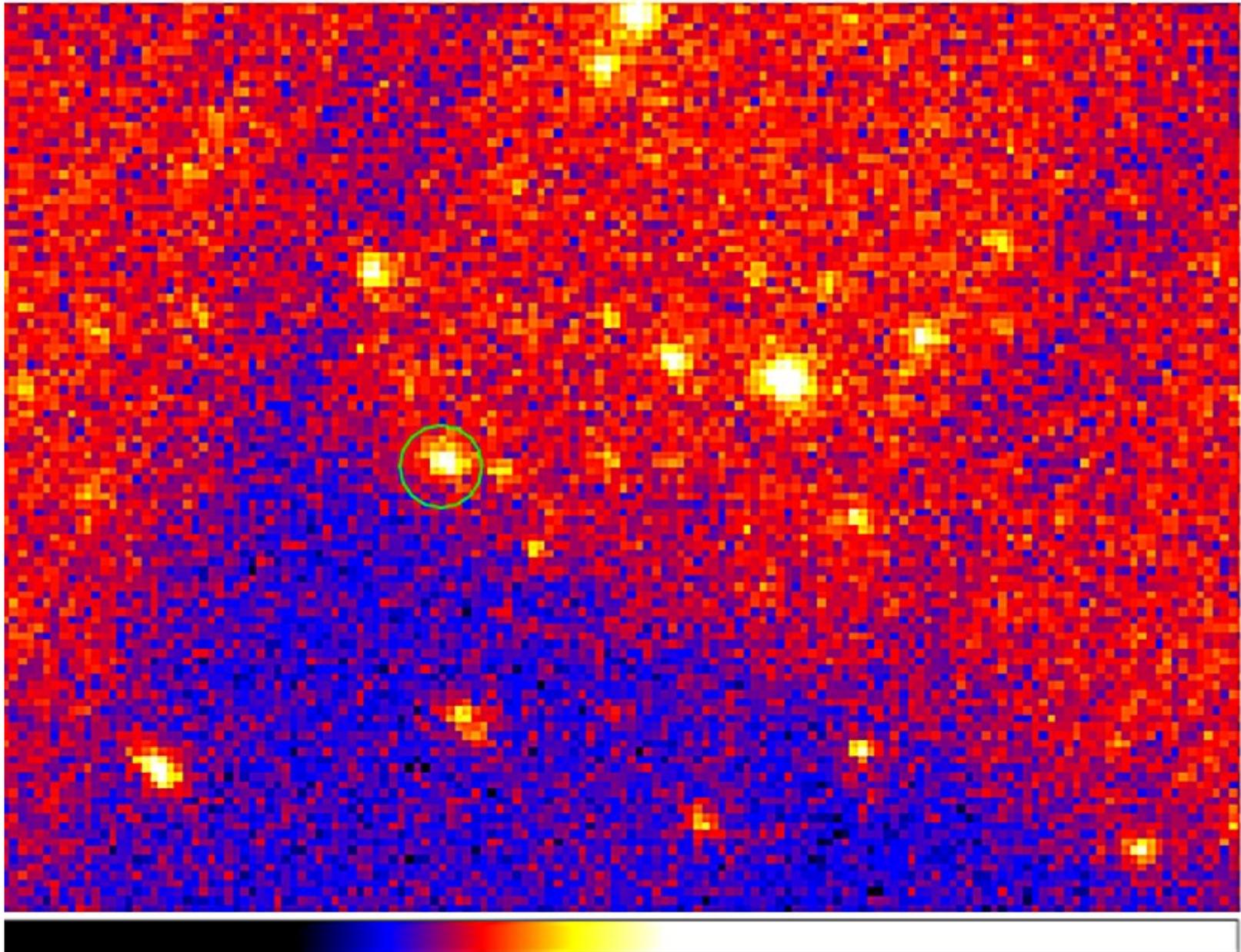
PN



Choosing background regions for spectra extraction

0.5-10 keV

MOS

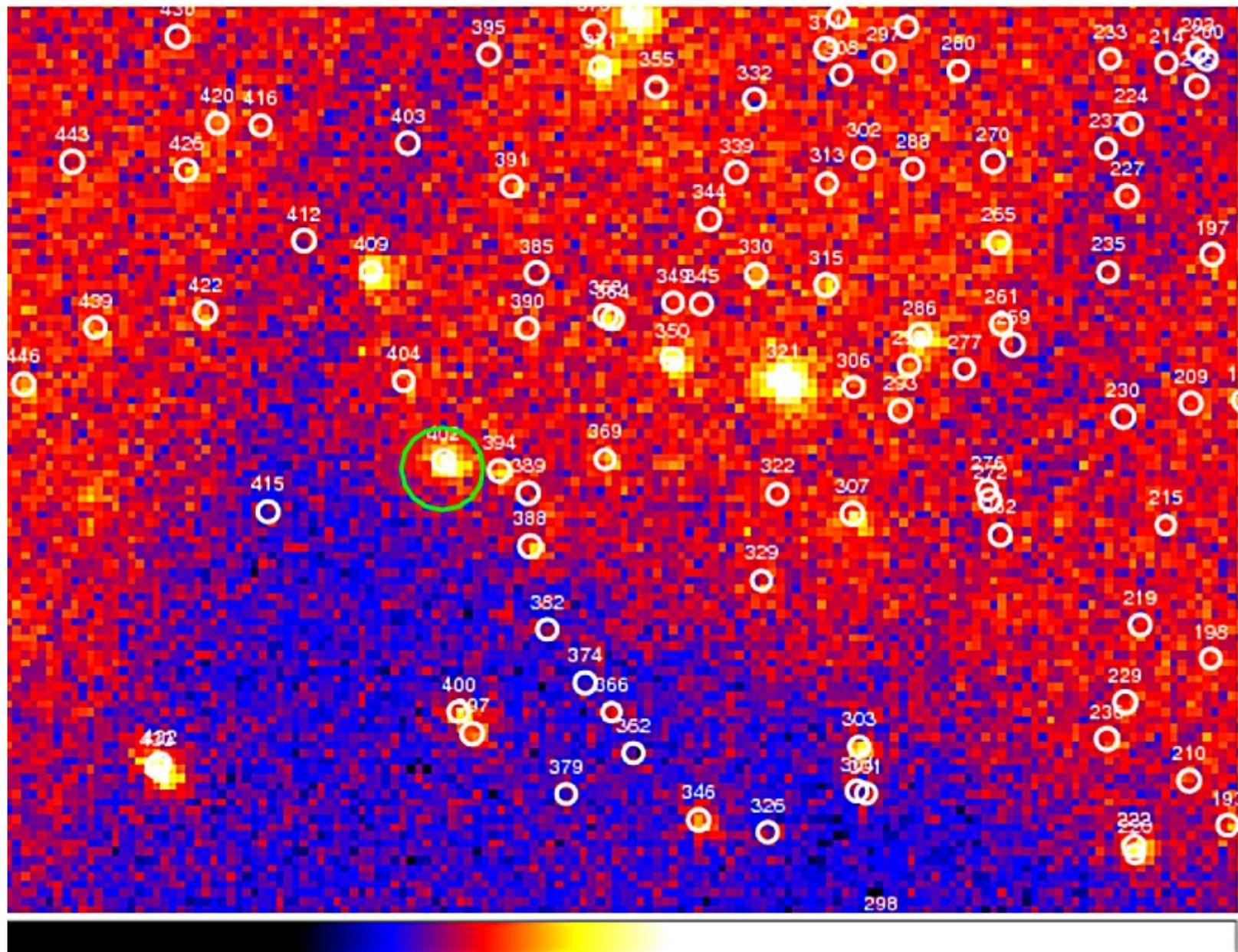


Choosing background regions for spectra extraction

0.5-10 keV

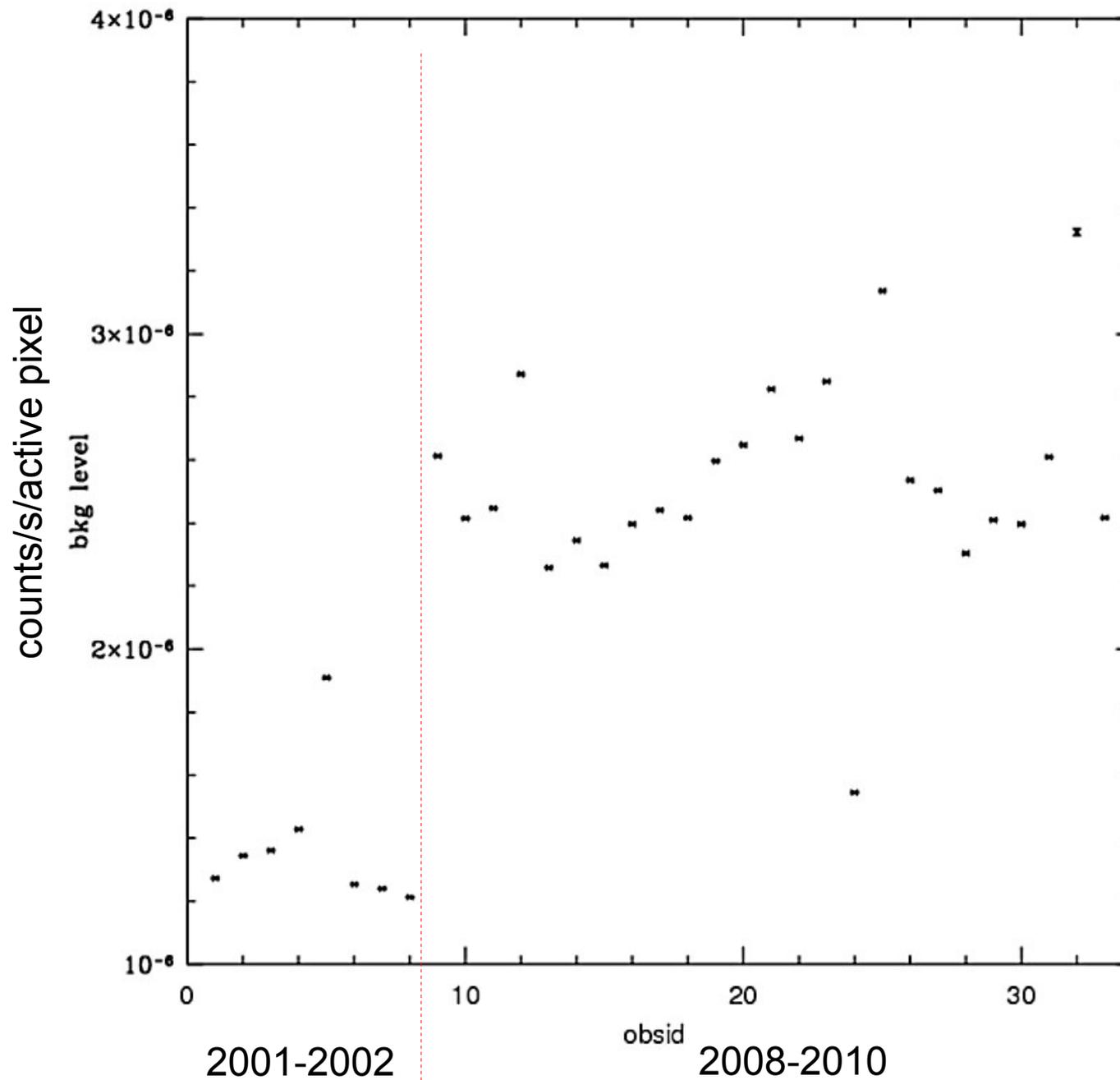
MOS

with
Chandra
catalogue
(Luo et al.)



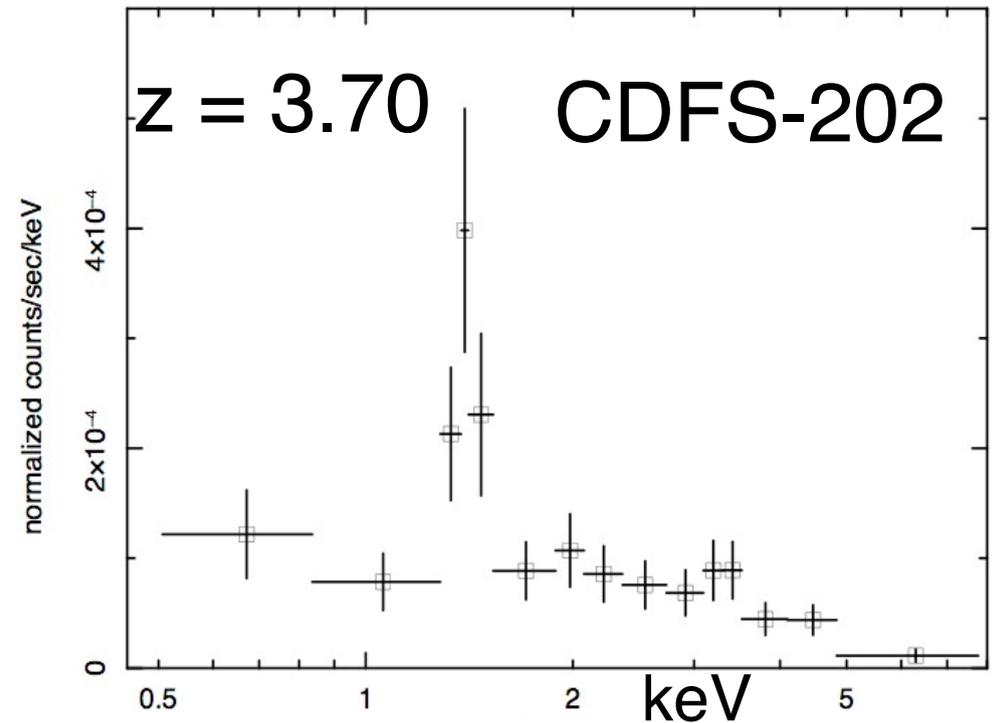
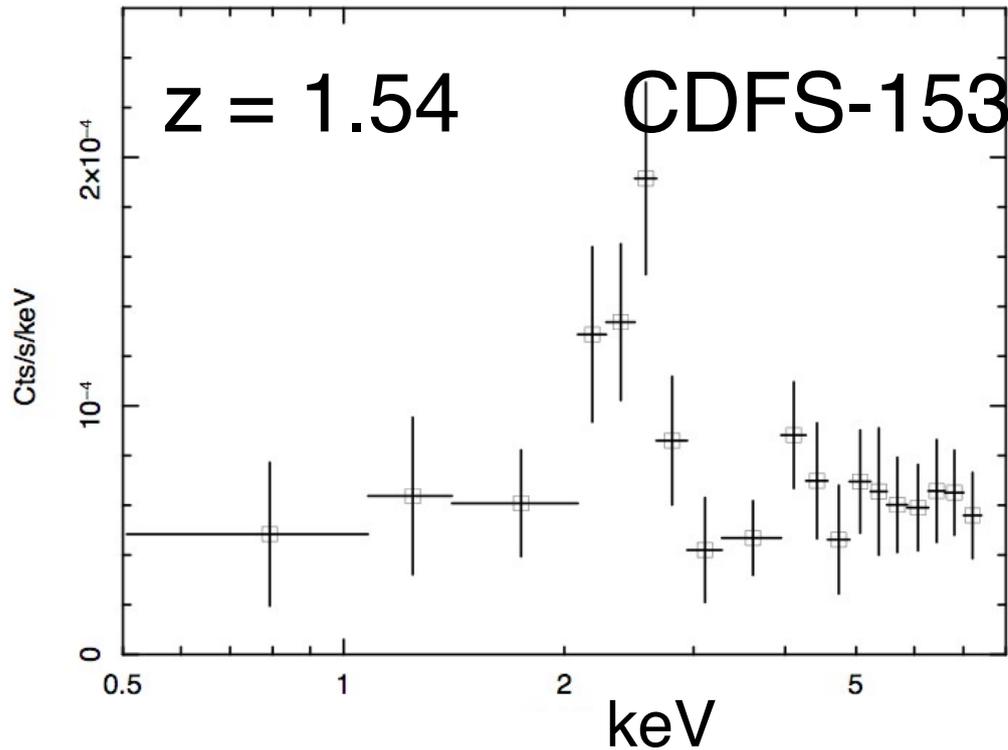
Background levels rised since 2002

pn
5-10 keV



Spectroscopy of Compton-thick sources

Two candidates selected from Tozzi et al.



pn spectra

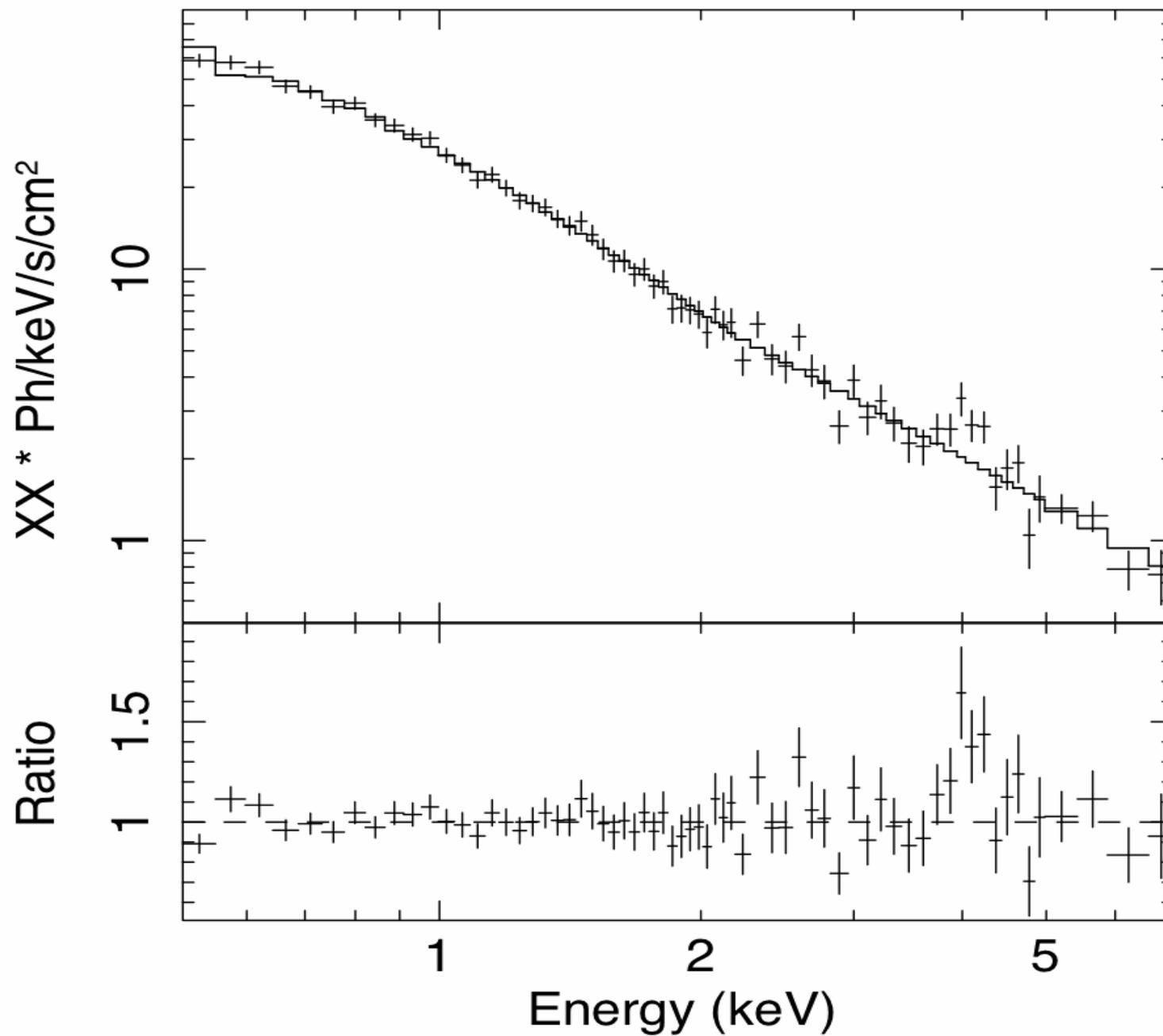
mos not shown

Total of 1300-1500 counts per source

EW \sim 1 keV

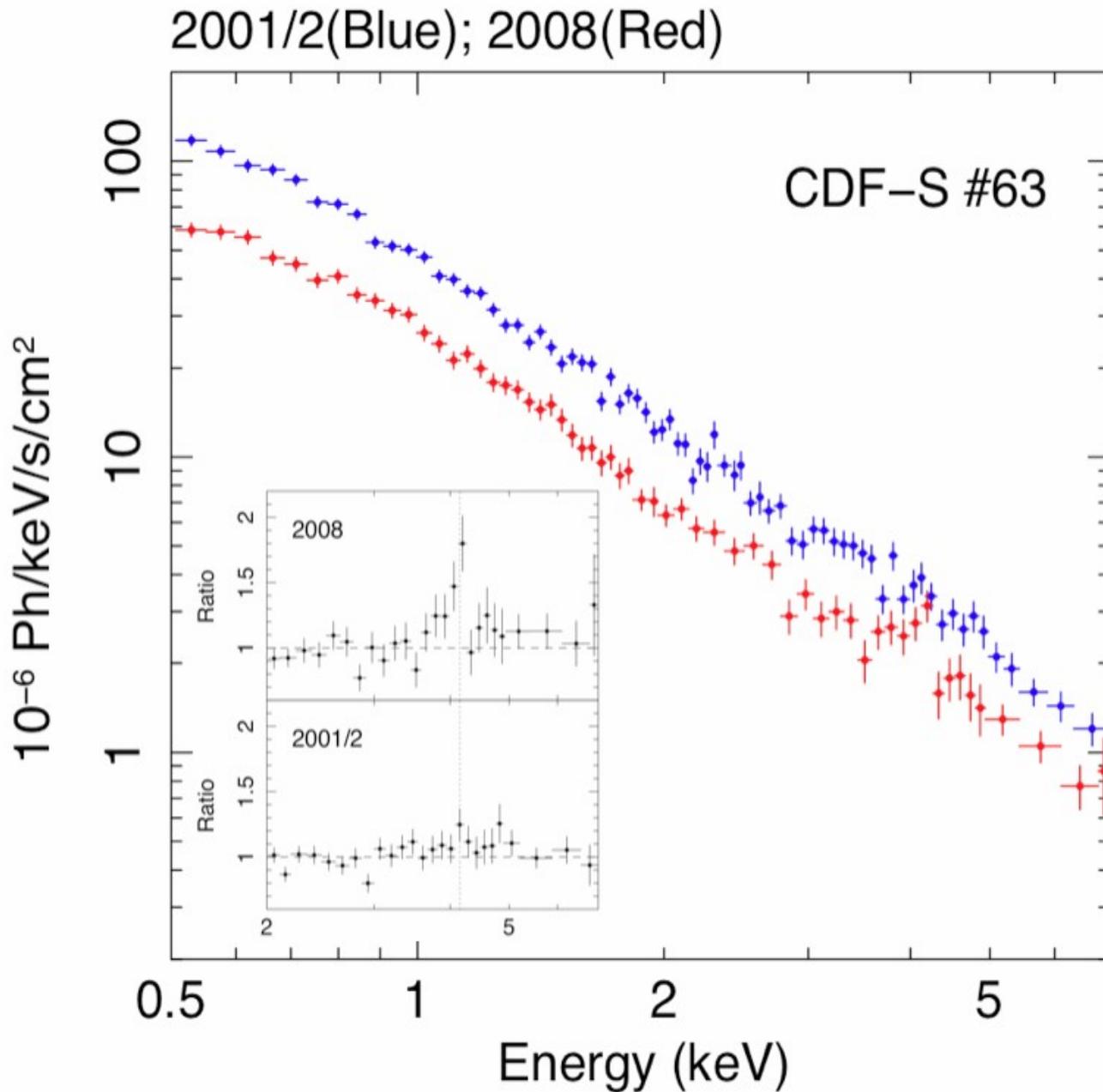
Stack of $z \sim 0.7$ sources

Showing Fe line



Variability of bright sources

Showing changes in spectra



Summary

Complex data analysis and reduction
Issues: background, source confusion

Ongoing and future science projects:

- Individual spectroscopy of bright sources
- Stacks of faint sources, searches for Fe lines
- Variability
- Multiwavelength investigations
- 5-10 keV $\log N \log S$
- ...