Multi-wavelength campaign on NGC 7469: the broad-band X-ray spectrum

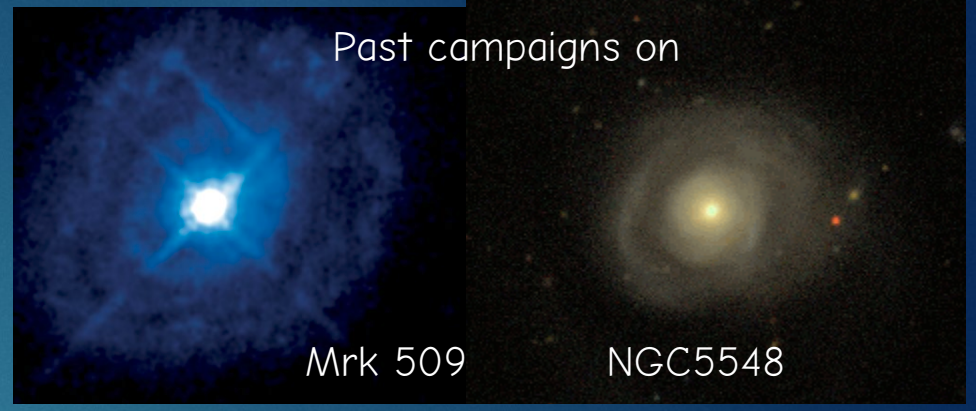
Riccardo Middei
on behalf of
the NGC 7469 consortium

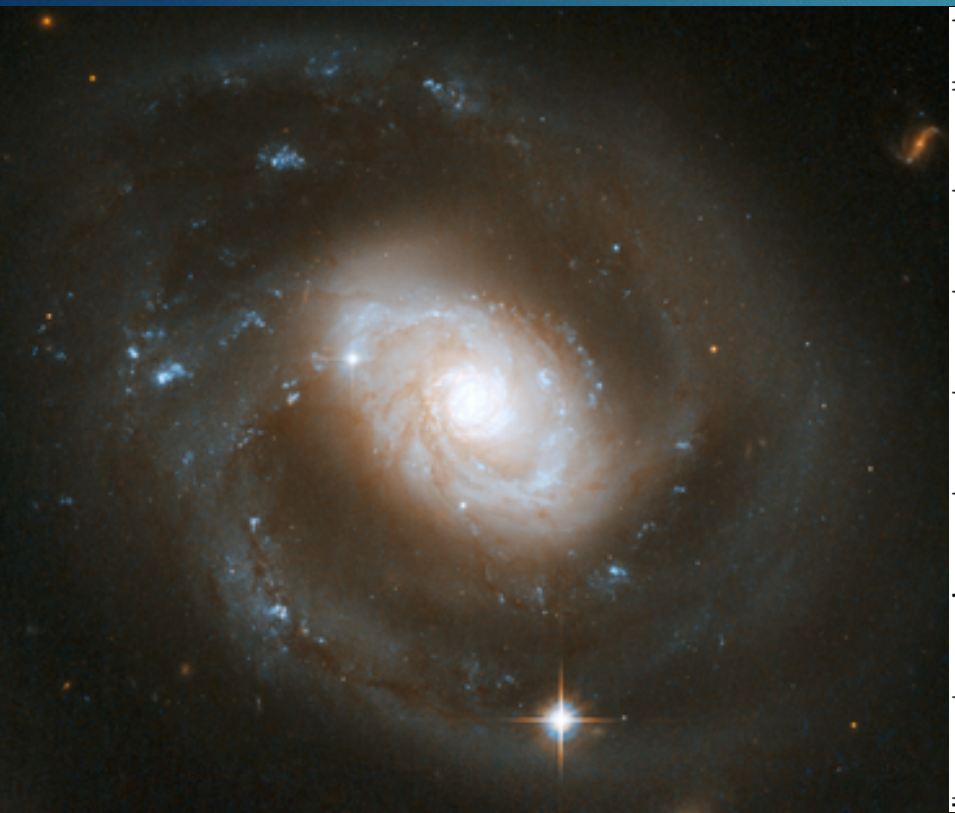
SEVENTH FRAMEWORK PROGRAMME
STRONGGRAVITY
EU FP7-SPACE research project 312789 2013 - 2017
ROMA TRE UNIVERSITÀ DEGLI STUDI

The campaign on NGC 7469

>properties of the outflow

>understand the nature of the continuum emission





7 observations

Obs. Satellites	Obs. ID	Star time	Net Exp. (s)
XMM-Newton	0760350201	2015-06-12	6.3e+04
Nustar	60101001002	2015-06-12	2.1e+04
XMM-Newton	0760350301	2015-11-24	5.9e+04
Nustar	60101001004	2015-11-24	2.0e+04
XMM-Newton	0760350401	2015-12-15	5.9e+04
Nustar	60101001006	2015-12-15	2.2e+04
XMM-Newton	0760350501	2015-12-23	6.2e+04
Nustar	60101001008	2015-12-22	2.3e+04
XMM-Newton	0760350601	2015-12-24	6.5e+04
Nustar	60101001010	2015-12-25	2.1e+04
XMM-Newton	0760350701	2015-12-26	6.7e+04
Nustar	60101001012	2015-12-27	2.1e+04
XMM-Newton	0760350801	2015-12-28	7.0e+04
Nustar	60101001014	2015-12-28	2.3e+04

NGC 7469

>Seyfert 1 galaxy

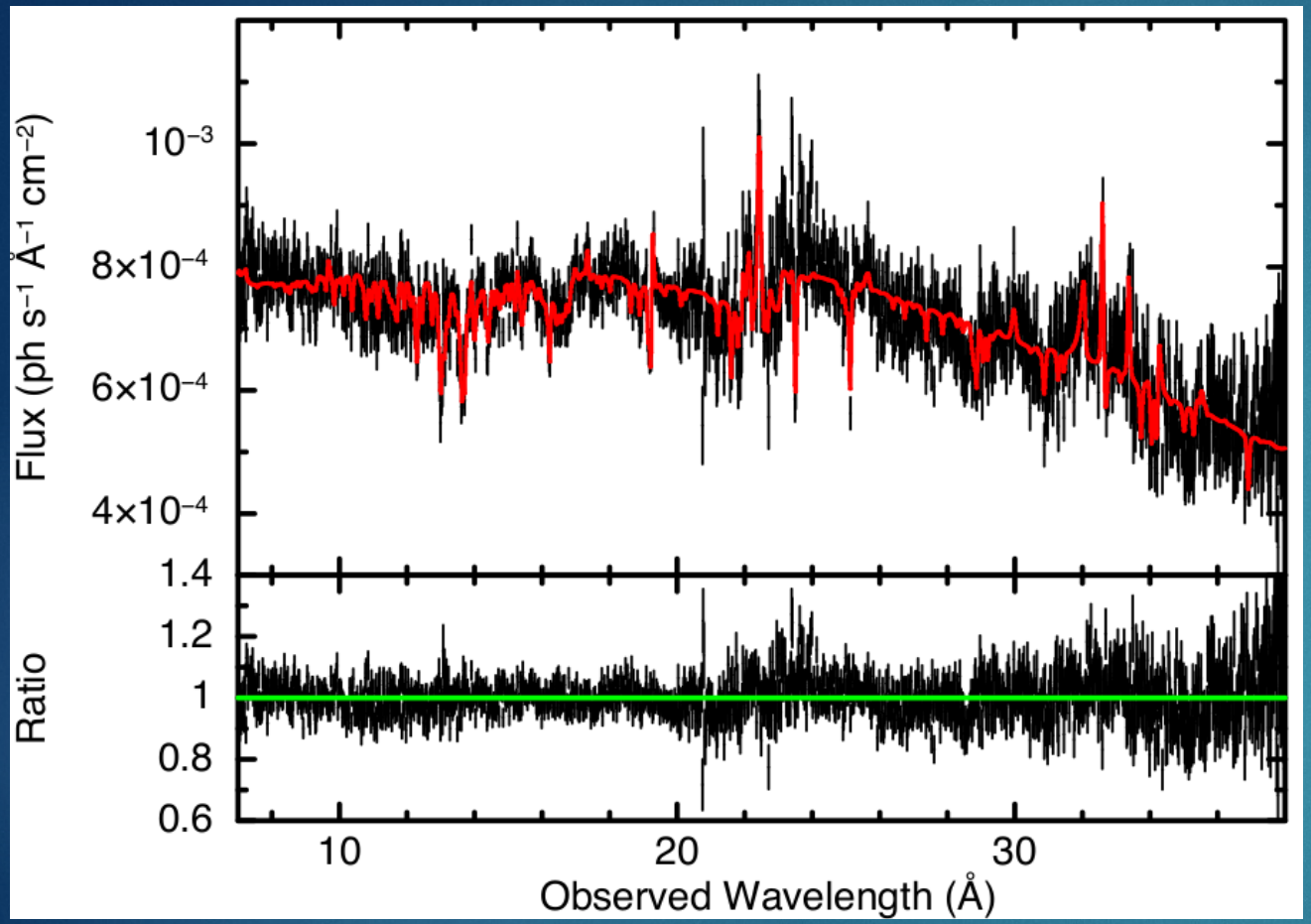
>z=0.016268

>M_bh=7M_sun

>variable source

>bright in the X-rays

First results from the campaign:



'Multi-wavelength campaign on NGC 7469 I. The rich 640 ks RGS spectrum.'

Behar et al. 2016

>Kinematics of the outflow

>elemental abundances

>Ionization and column density

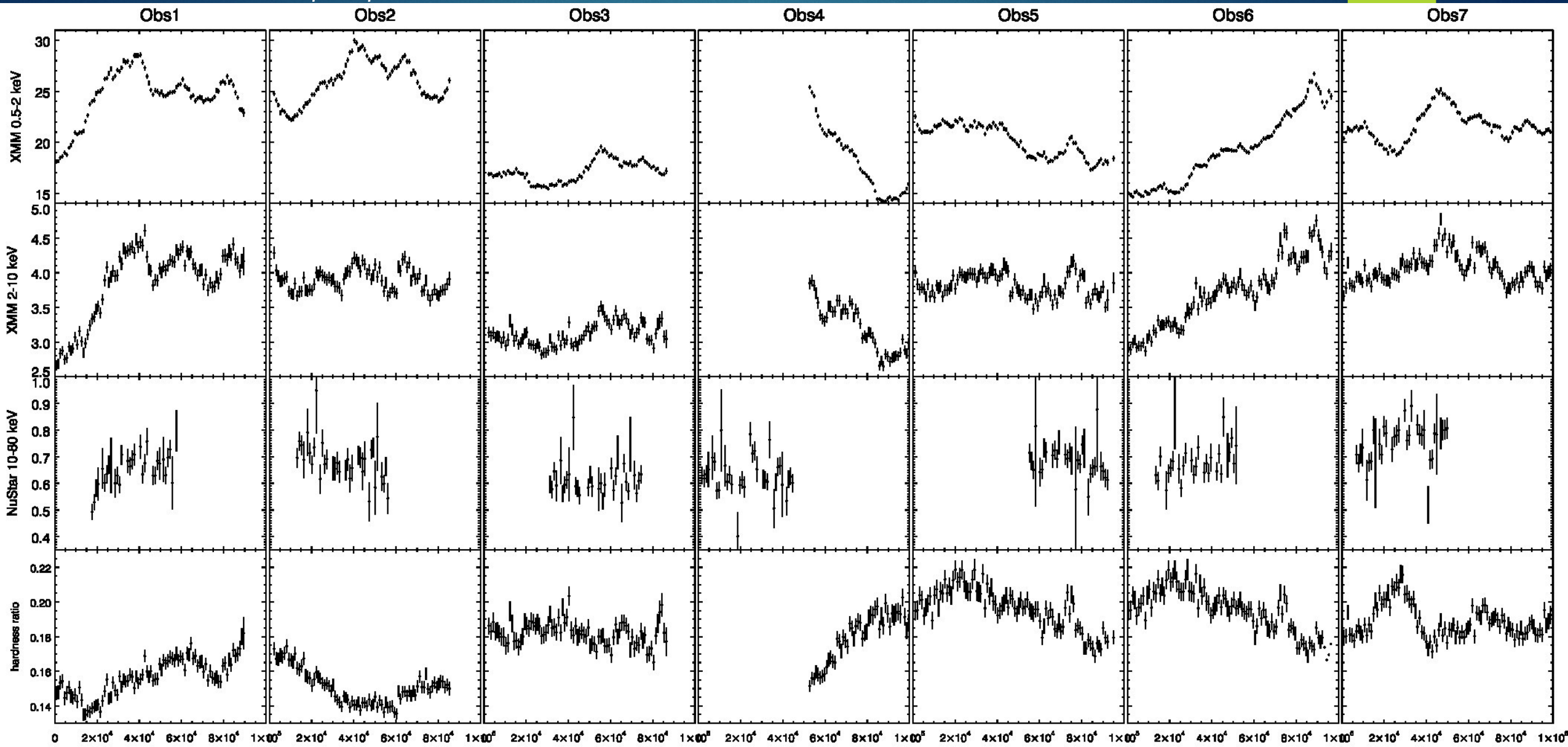
>emission features

>location of the outflow

Timing analysis

Middei et al. in prep.

NGC 7469 is a variable source



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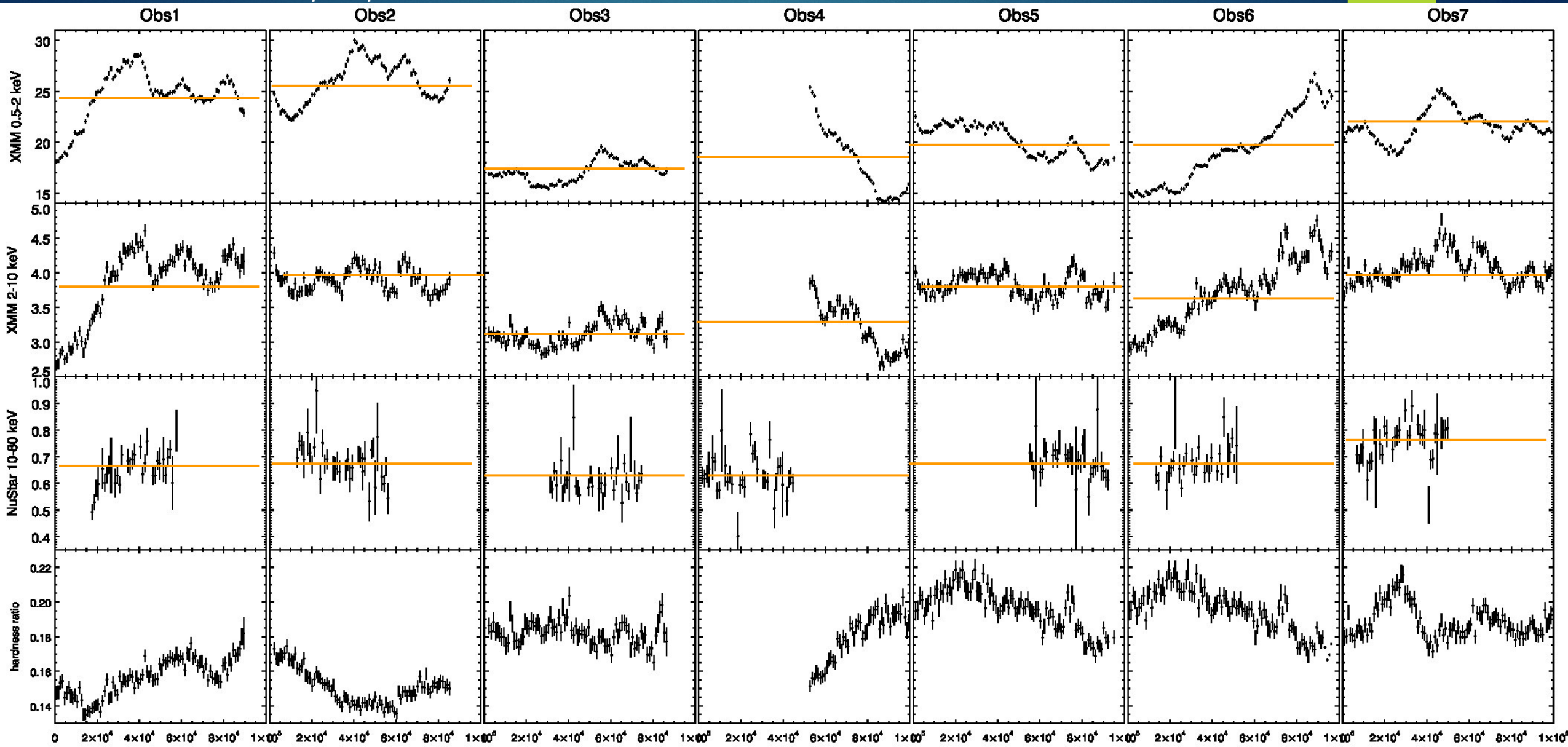
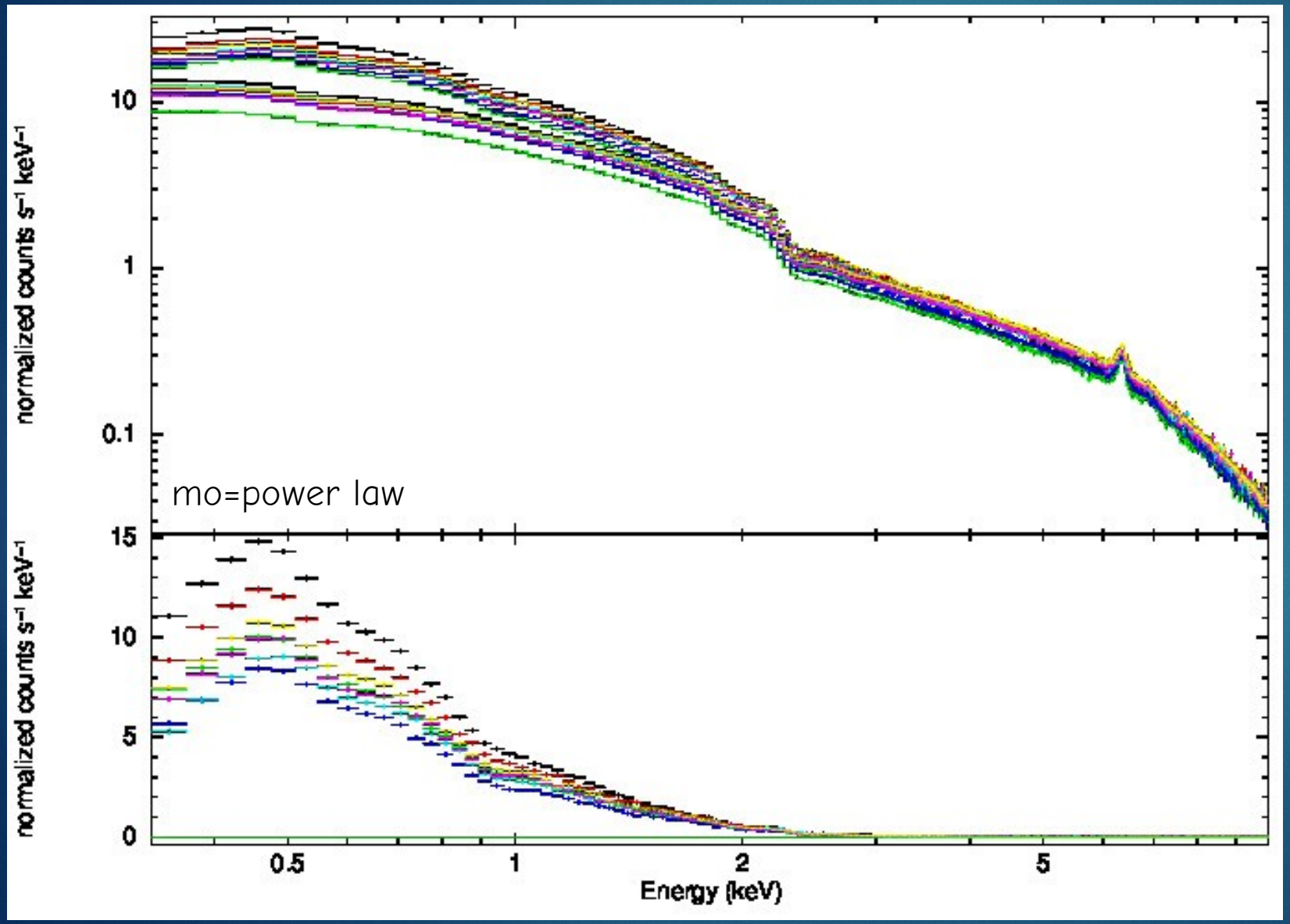


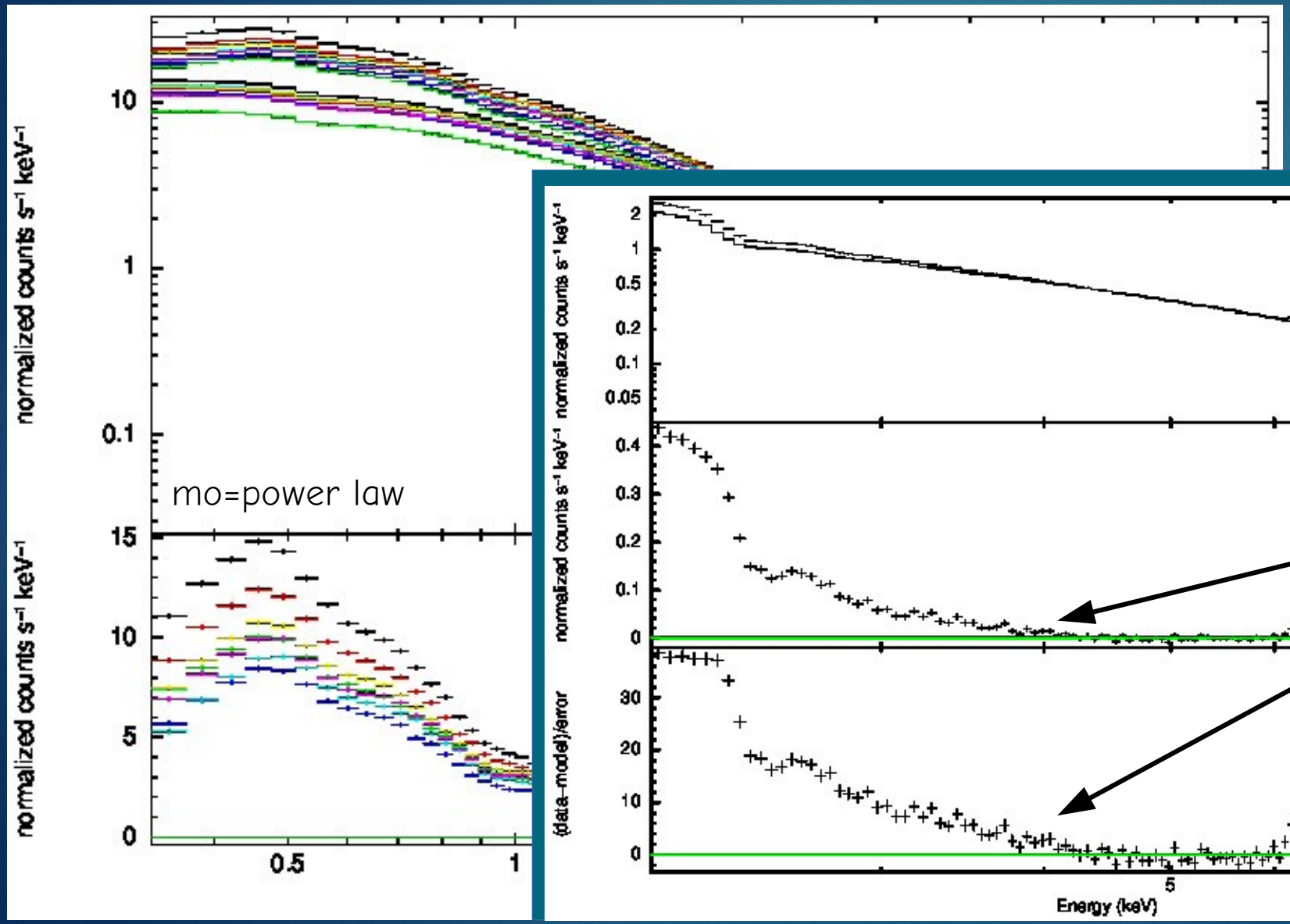
The XMM-Newton spectra



At least one more component is needed to fit the soft band

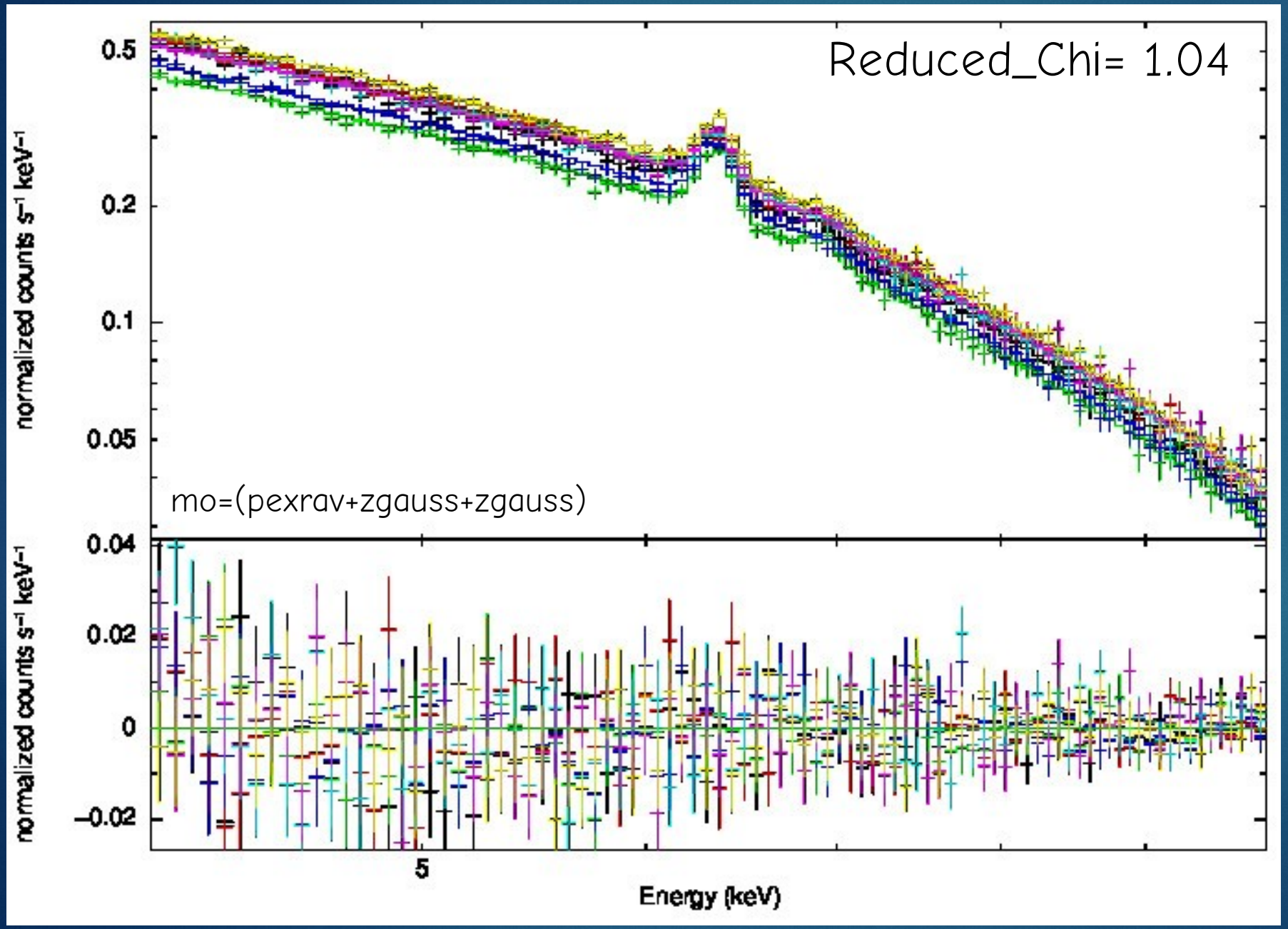
This soft excess extends up to
4 keV

The XMM-Newton spectra



First step: We study XMM-Newton spectra in the 4-10 keV band

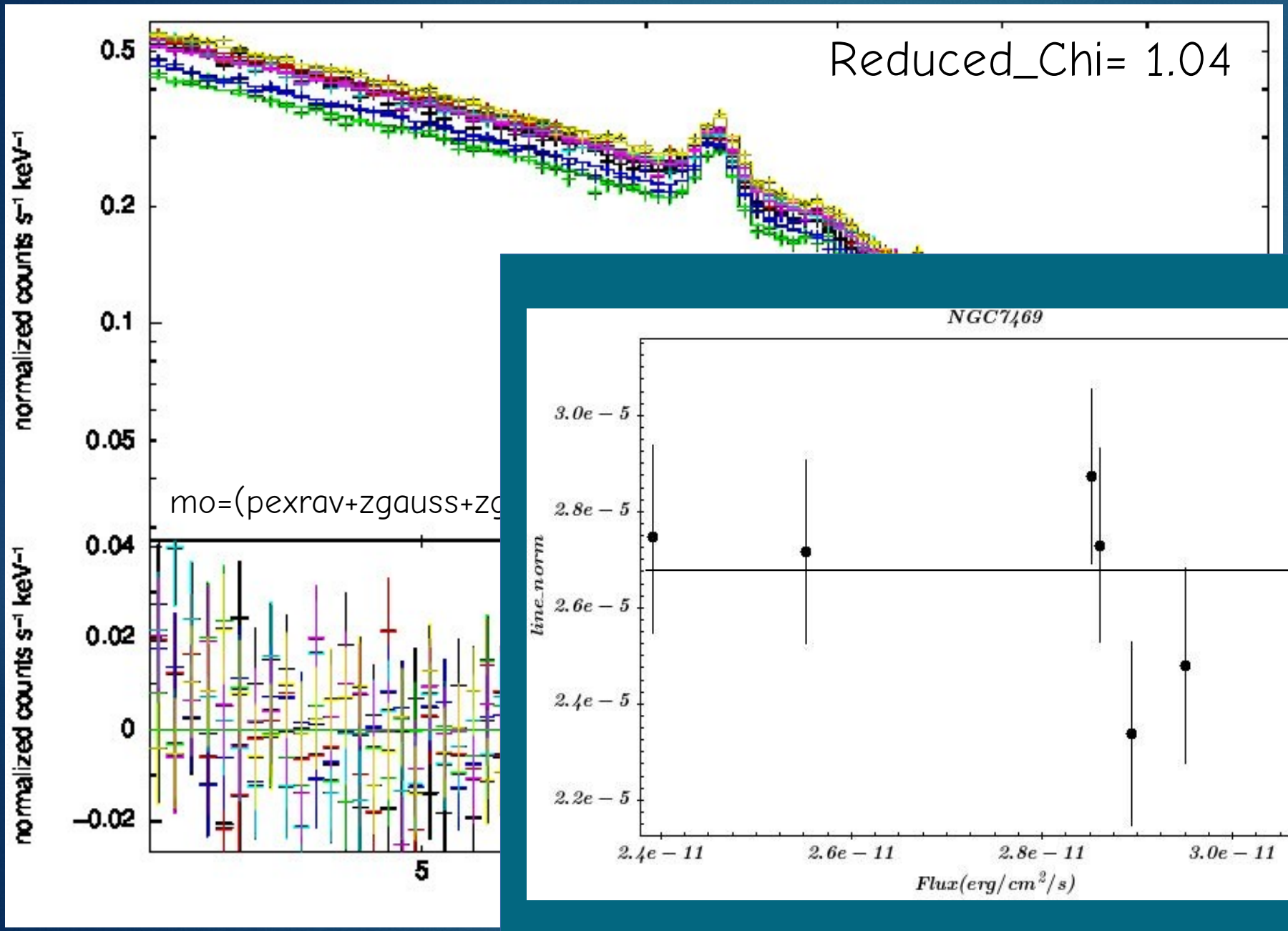
The XMM-Newton best-fit

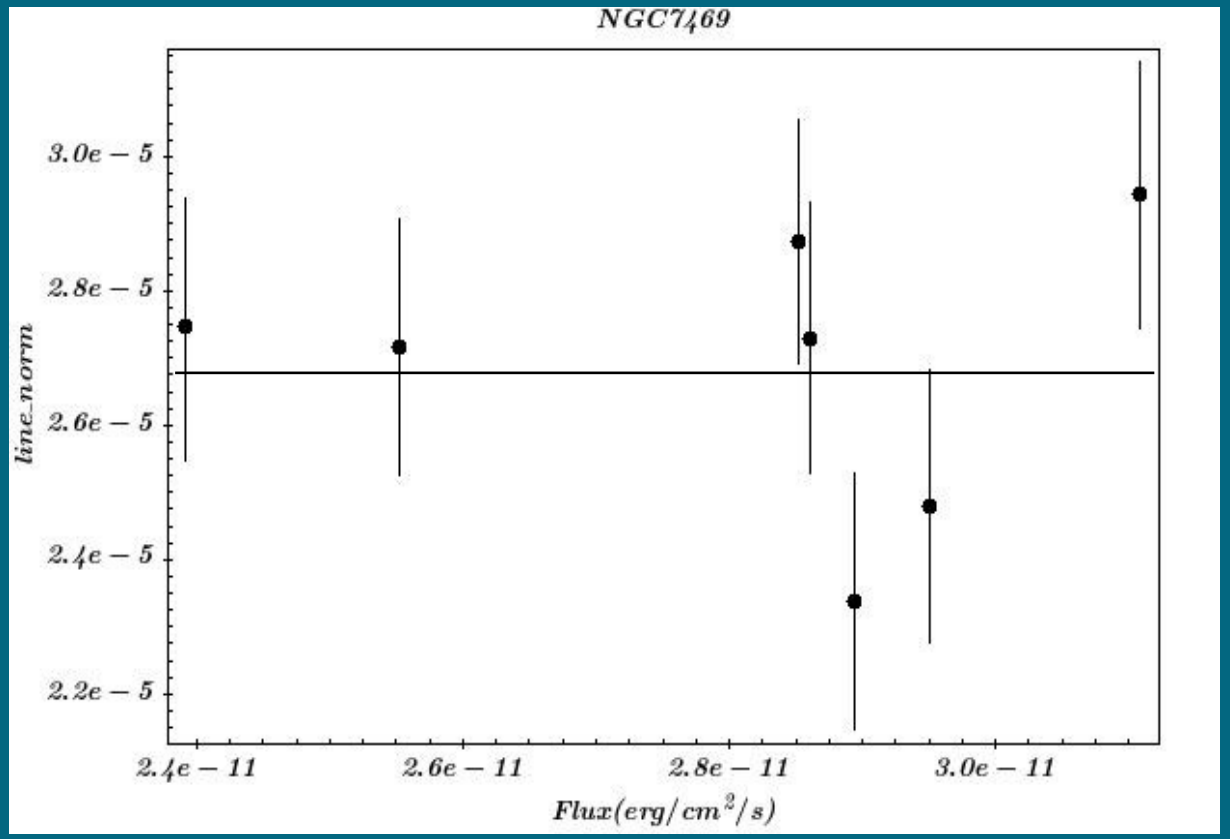


Neutral FeK\alpha

FeXXVI Ly\alpha

The XMM-Newton best-fit





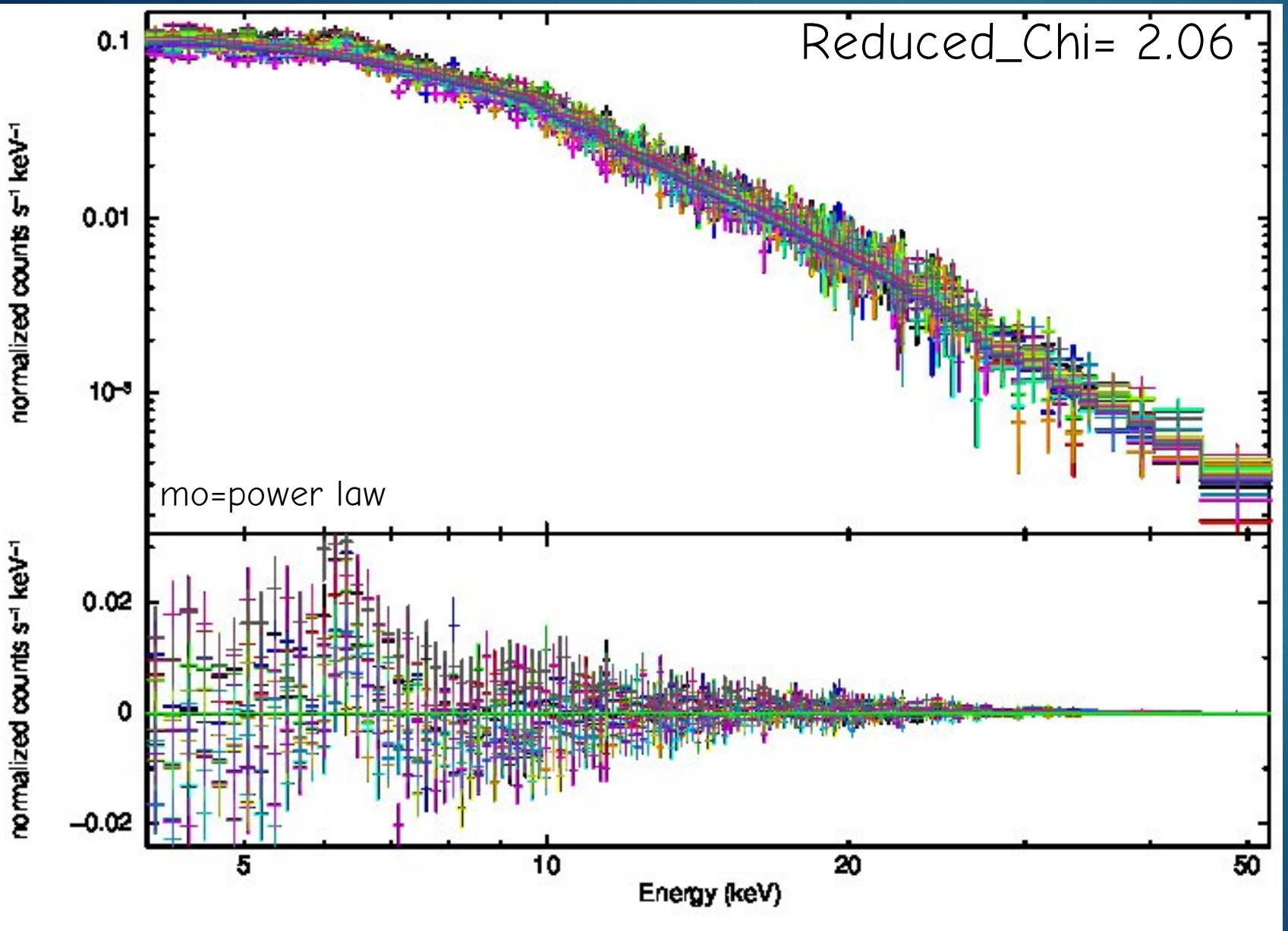
The neutral iron line

>constant

>narrow (no relativistic broadening)

->EQW~90 eV

NuSTAR spectral analysis:



Using information obtained from previous XMM-Newton analysis

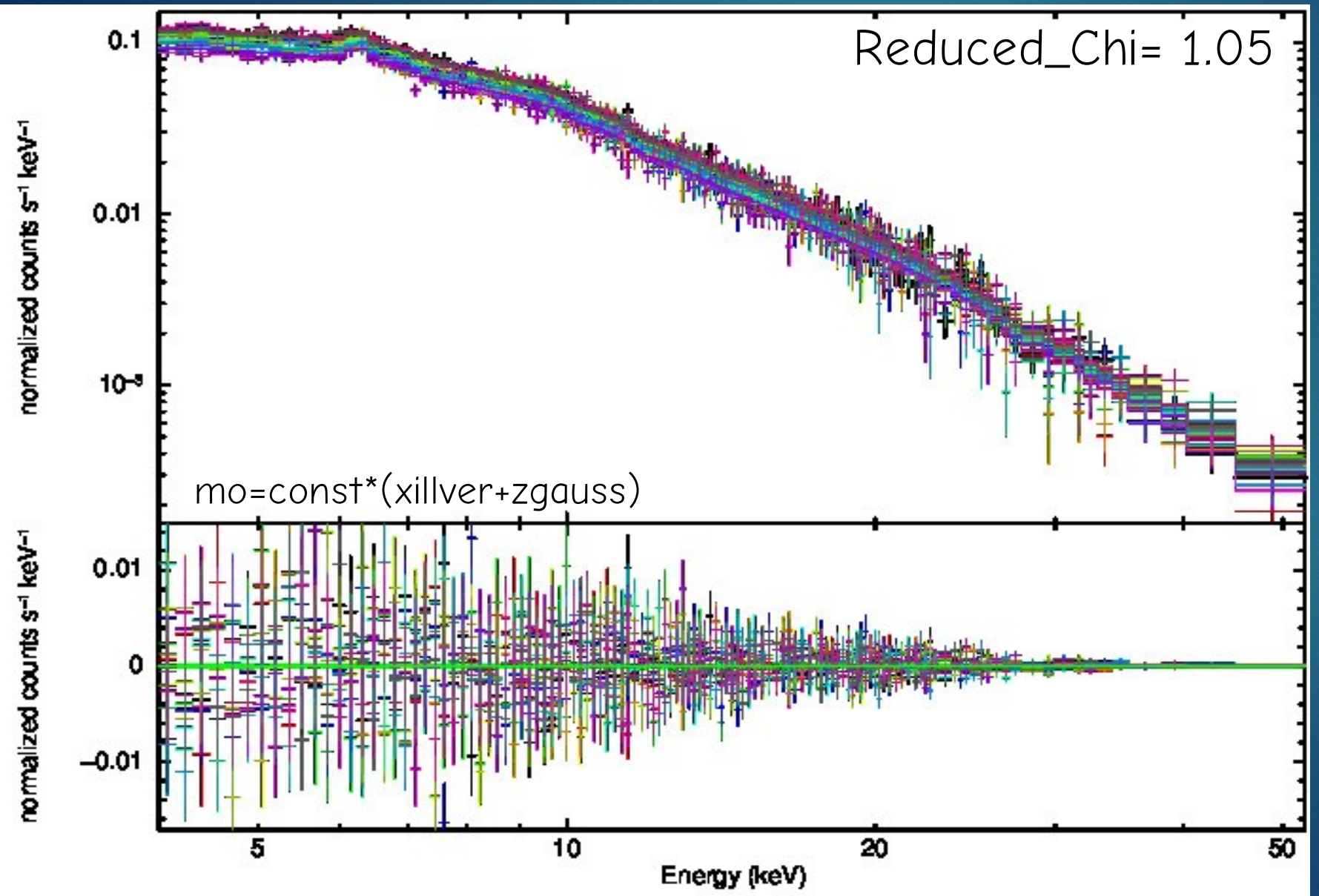
-no relativistic effects

-consistent reflection model: hump + narrow iron line at 6.40 keV

-narrow iron line at 6.966 keV

-high energy cut-off

NuSTAR spectral analysis:



Information on

>high energy cut-off

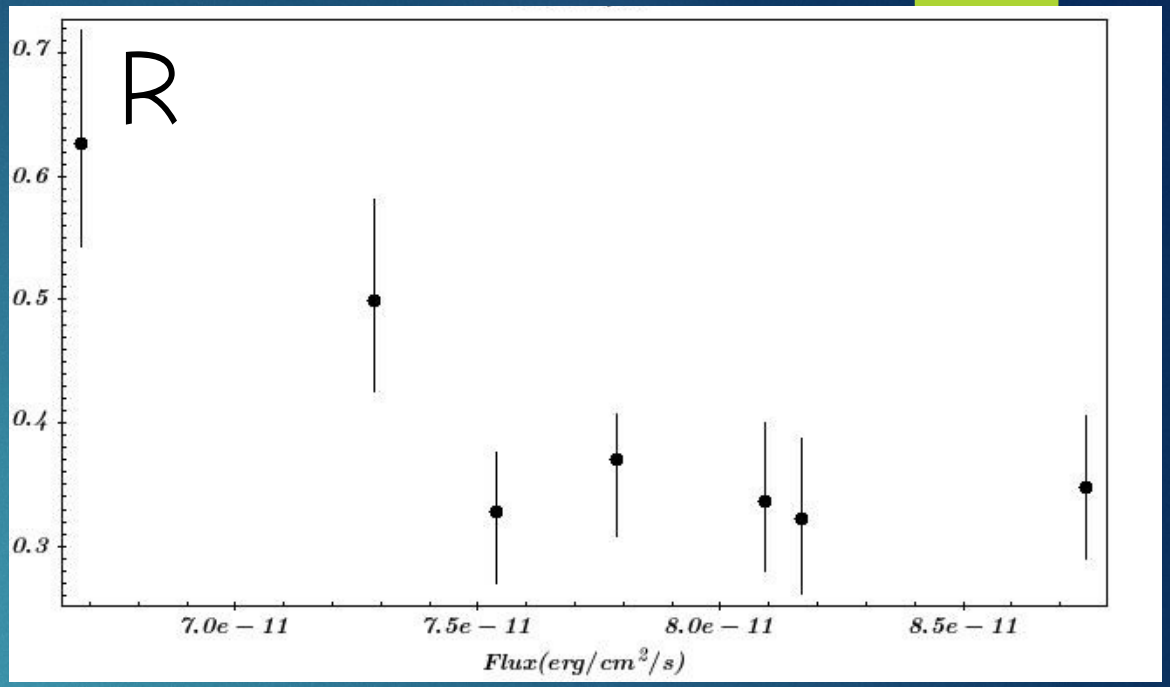
> reflection component

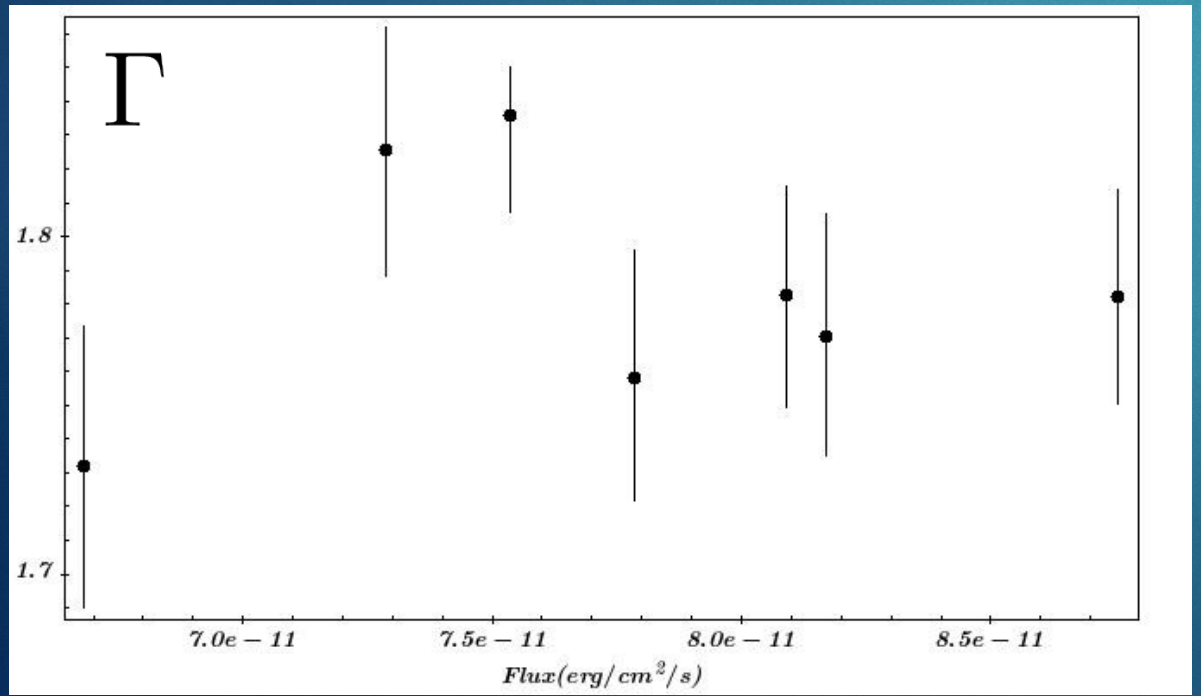
NuSTAR spectral analysis some results

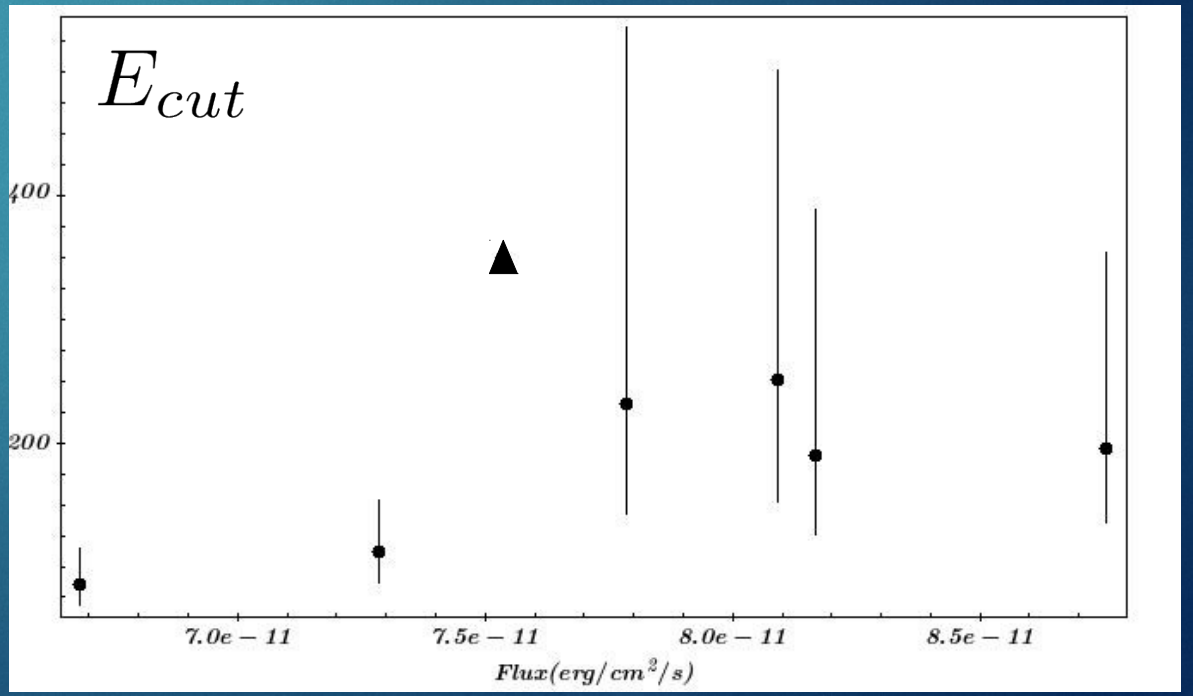
>High energy cut-off ~180 keV

>Reflection ~0.40

>Gamma ~1.78







NuSTAR spectral analysis some results

>High energy cut-off ~180 keV

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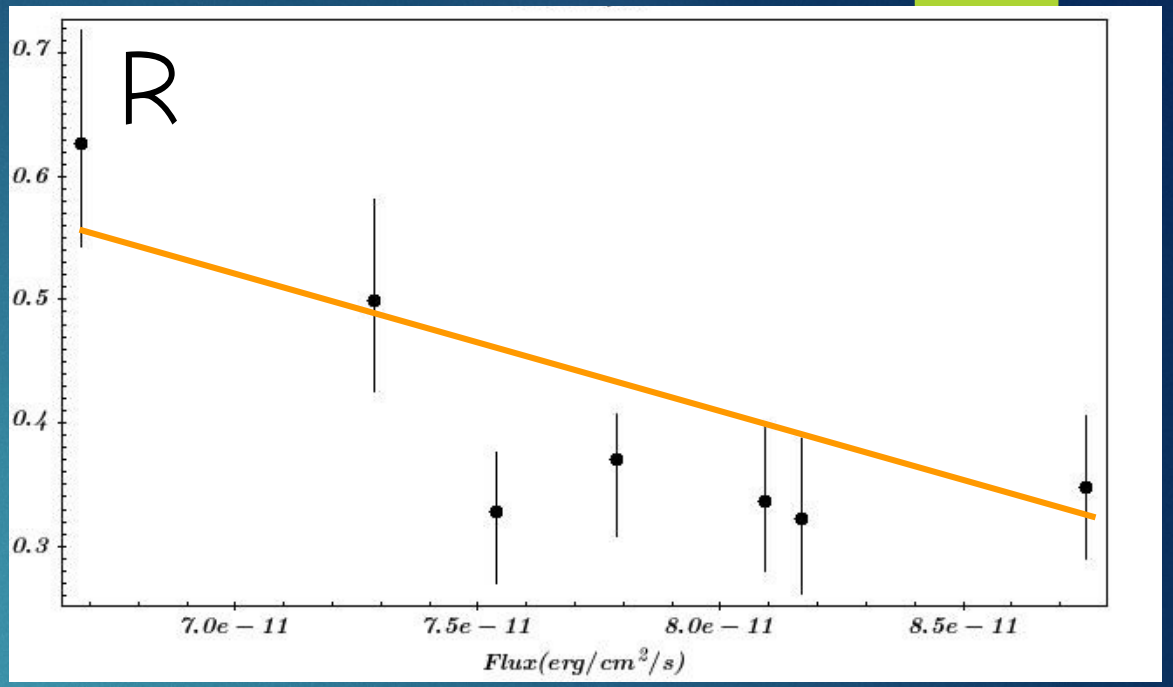
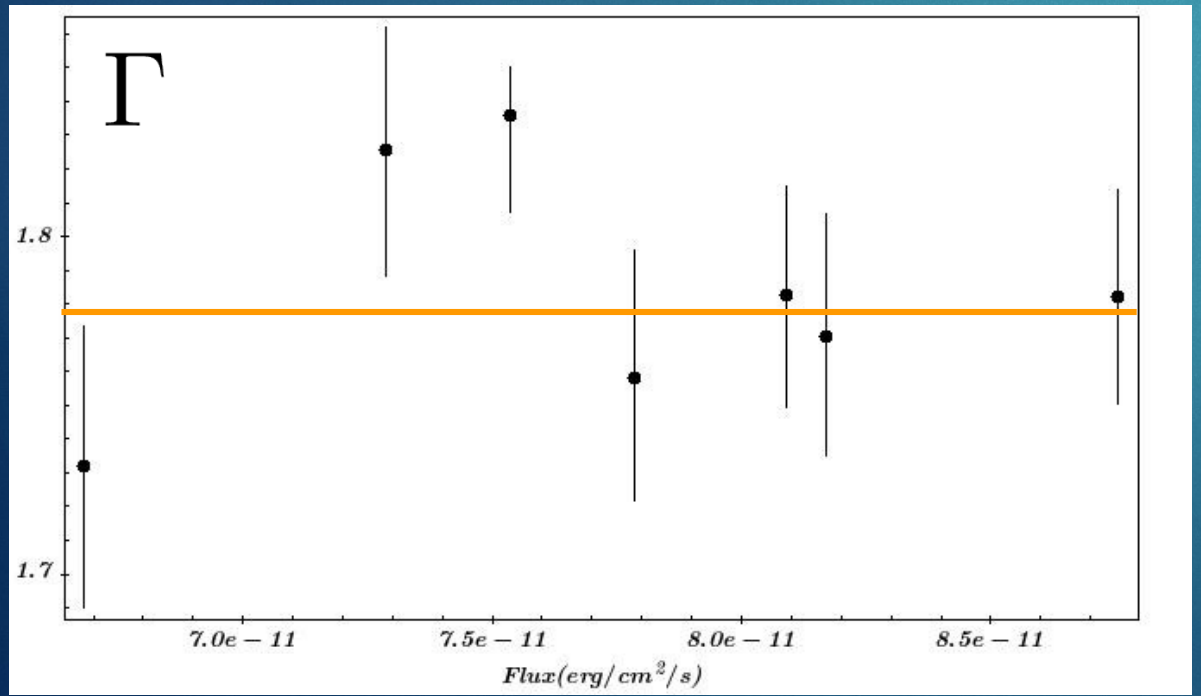
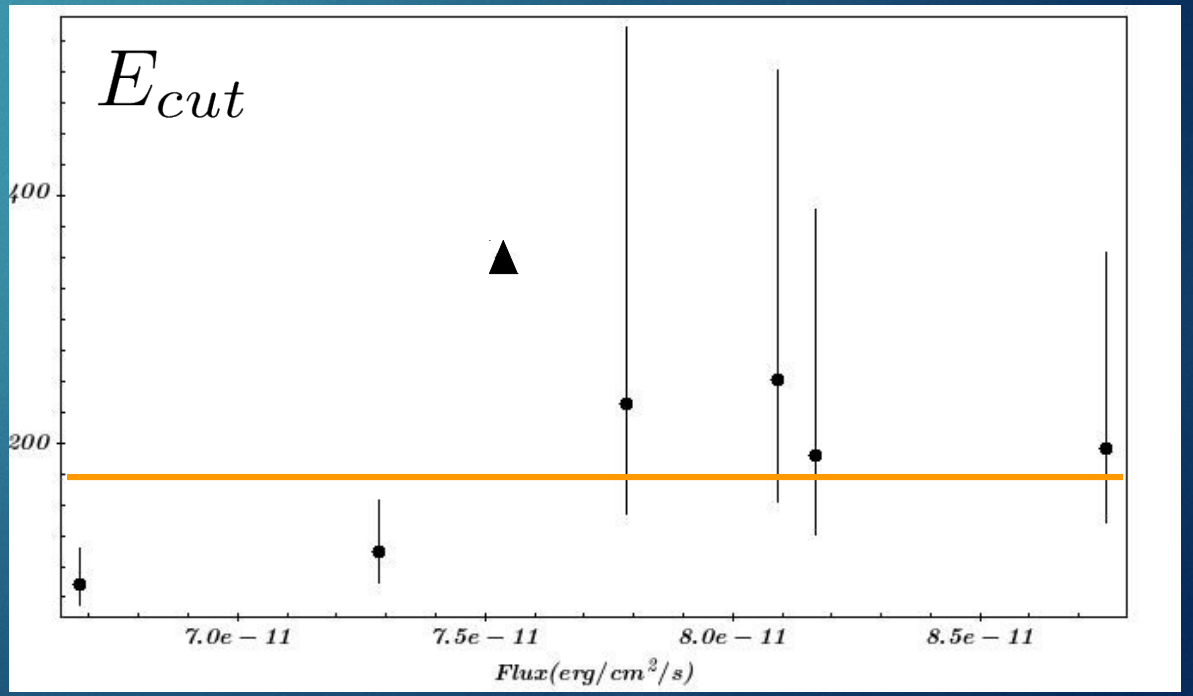
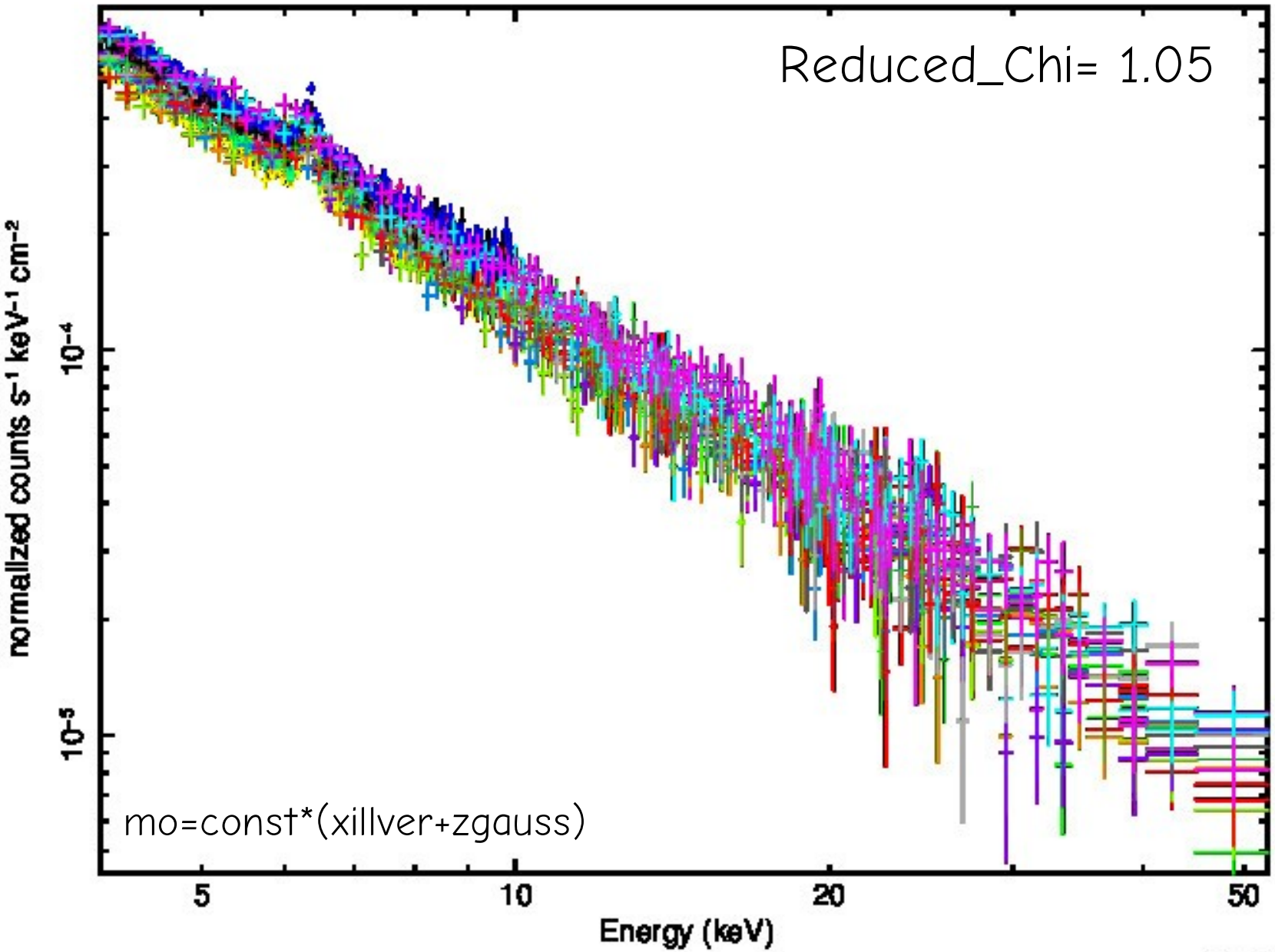






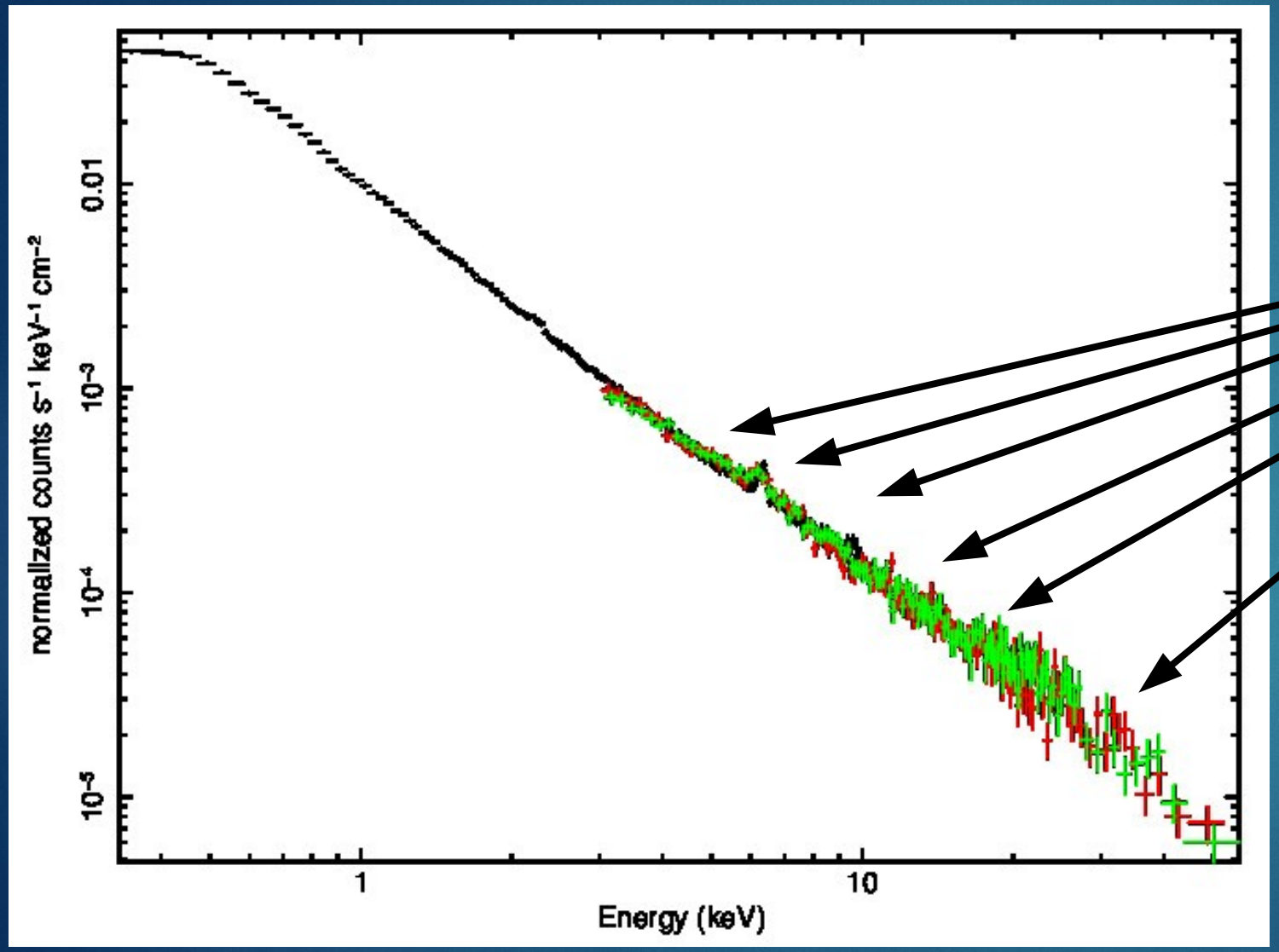
XMM-Newton & Nustar 4-78 keV analysis



Inter-calibration:

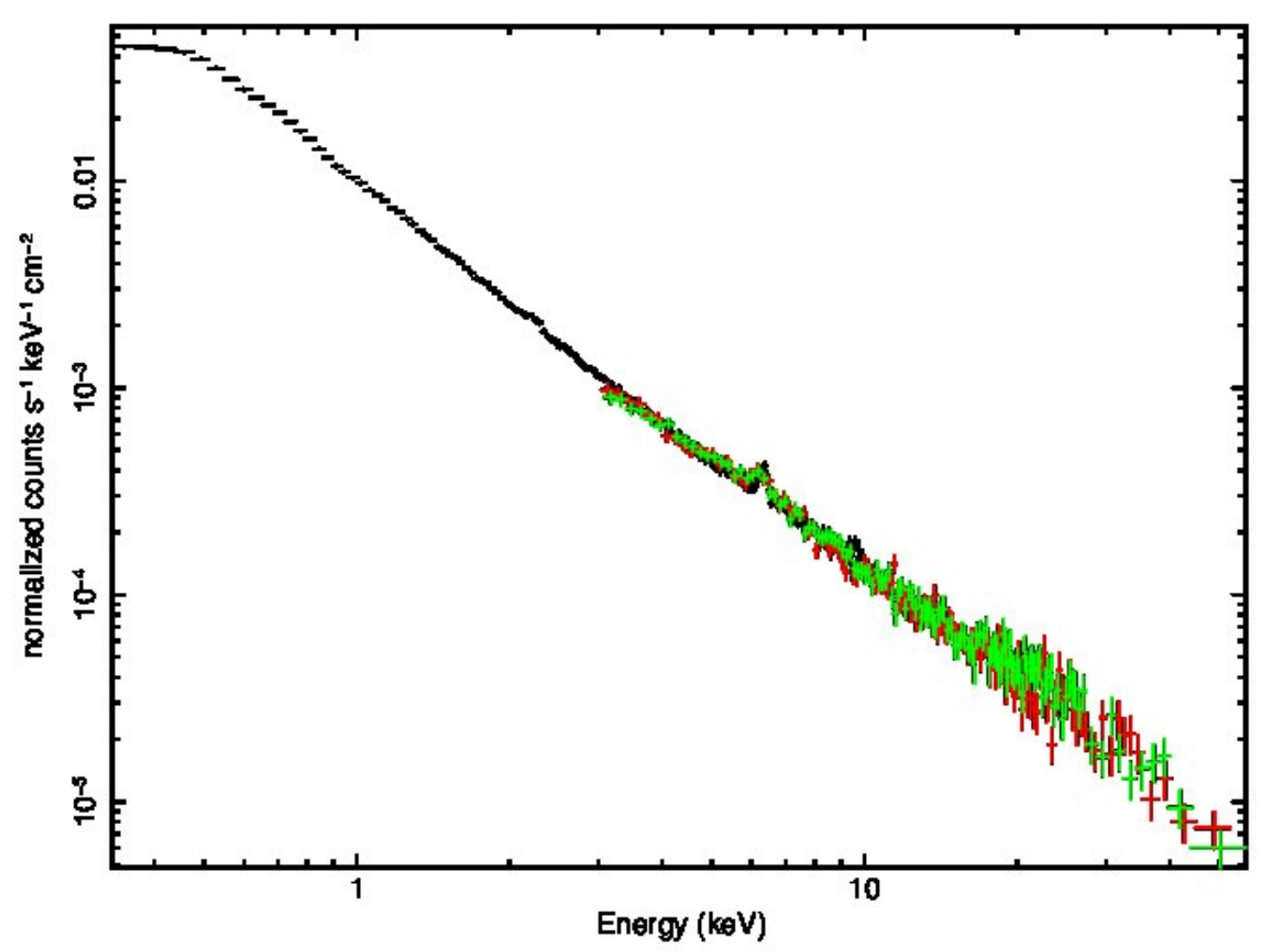
A difference (~0.17) between the XMM-Newton and NuSTAR gamma is found

XMM-Newton & Nustar 0.3-78 keV analysis



4-78 keV band already constrained

XMM-Newton & Nustar 0.3-78 keV analysis



4-78 keV band
already constrained

0.3-78 keV band
Work in progress ...

Summary

>NGC 7469 varies much on short time-scales while hardness ratios do not vary a lot

>No evidence of relativistic effects on the iron line which is constant along with its associated reflection component

>Cut-off at ~180 keV, constant among the observations

>No evidence of variability of Gamma among the observations

....waiting for the whole spectral analysis

Thanks for your attention