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

Riccardo Middei on behalf of the NGC 7469 consortium
The campaign on NGC 7469

- properties of the outflow
- understand the nature of the continuum emission

7 observations

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NGC 7469

- Seyfert 1 galaxy
- $z=0.016268$
- $M_{bh}=7M_{\text{sun}}$
- variable source
- bright in the X-rays
First results from the campaign:

> Kinematics of the outflow
> Elemental abundances
> Ionization and column density
> Emission features
> Location of the outflow

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

Behar et al. 2016
Timing analysis

NGC 7469 is a variable source

Middei et al. in prep.
NGC 7469 is a variable source

Middei et al. in prep.
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

Reduced_Chi= 1.04

mo=(pexrav+zgauss+zgauss)

Neutral FeK\alpha

FeXXVI Ly\alpha
The XMM-Newton best-fit

\[ \text{Reduced Chi} = 1.04 \]

The neutral iron line

- Constant
- Narrow (no relativistic broadening)

\[ \text{EQW} \approx 90 \text{ eV} \]
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

Reduced Chi = 2.06
NuSTAR spectral analysis:

\[ mo = \text{const} \times (\text{xillver} + \text{zgauss}) \]

Reduced_{\text{Chi}} = 1.05

Information on
> high energy cut-off
> reflection component
NuSTAR spectral analysis
some results

> High energy cut-off $\sim 180$ keV
> Reflection $\sim 0.40$
> Gamma $\sim 1.78$
NuSTAR spectral analysis
some results

> High energy cut-off $\sim 180$ keV
> Reflection $\sim 0.40$
> Gamma $\sim 1.78$
XMM-Newton & Nustar 4-78 keV analysis

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

\[ \text{Reduced}\_\text{Chi}= 1.05 \]

\[ \text{mo}=\text{const}*(\text{xillver}+\text{zgauss}) \]
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 ...
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.
Thanks for your attention

....waiting for the whole spectral analysis