The phenomenological XMM-Newton RGS model of N132D (Status report)

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Overview

- Motivation
- Data selection
- Modelling
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- Future planning

Motivation

Same as for 1 E0102.2-7219 campaign:

Define a “standard candle” spectrum for instrument/mission cross calibration without caring (too much) about physics.

1 E0102.2-7219:

+: Simple line spectrum thanks to absense of Iron.

±: Small size remnant.

-: Soft spectrum (E < 2 keV).

N132D:

+: Harder spectrum than 1 E0102-7219 (E < 8 keV).

±: Iron rich remnant: Lines over lines over lines…

-: More extended.

Data selection

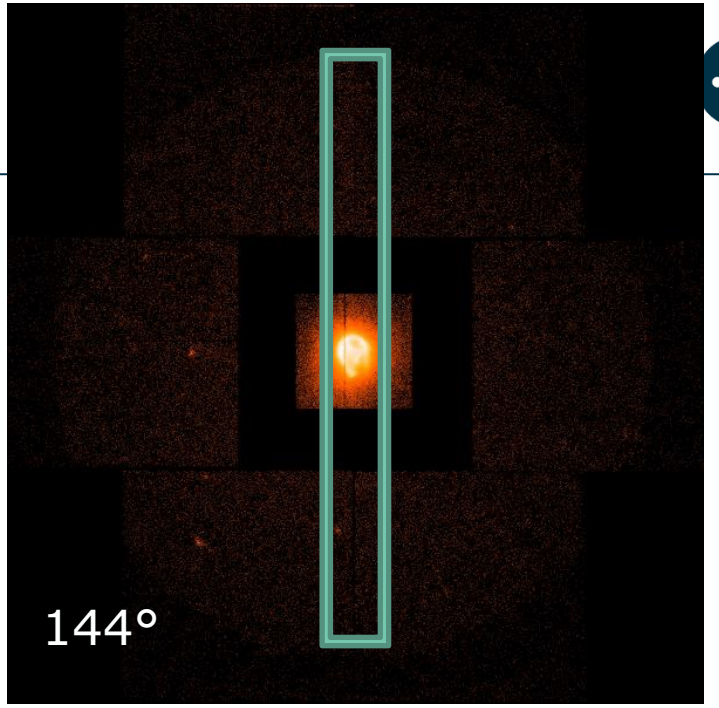
Two data sets of combined exposures:

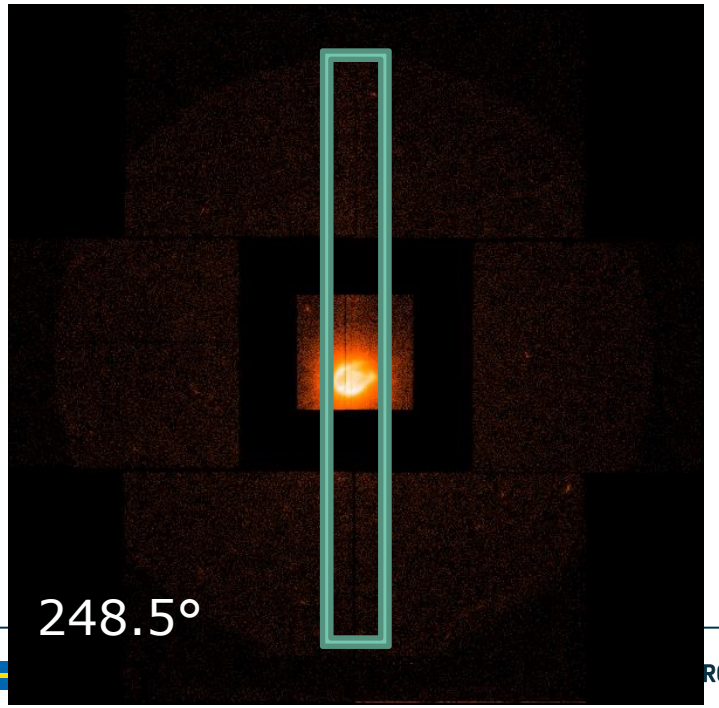
Data set one:

- 8 exposures between revs. 0535-0606 (ObsIDs 0157*).
- Boresight position: RGS1.
- Position angles increasing from 144 to 288 degrees.

Data set two:

- 8 exposures between revs. 1311-3149 (ObsIDS 041418*)
- Boresight position: EPIC-pn.
- Position angles: 6 x 247 + 2 x 248.5 degrees.





Modelling

Indeed somebody did the job caring for the physics:

Suzuki et al. 2020ApJ,900,39S:

Plasma diagnostics of SNR N132D using deep XMM-Newton observations using RGS

Phenomenological model:

- Absorption: local (TBabs) and LMC (TBvarabs)
- Continua: 3 x nlapec for RGS (Suzuki et al.) + 1 x nlapec for high energies (E > 2 keV).
- Lines: until the residuals become flat (currently 108 lines within RGS band).
- General normalisation constant.

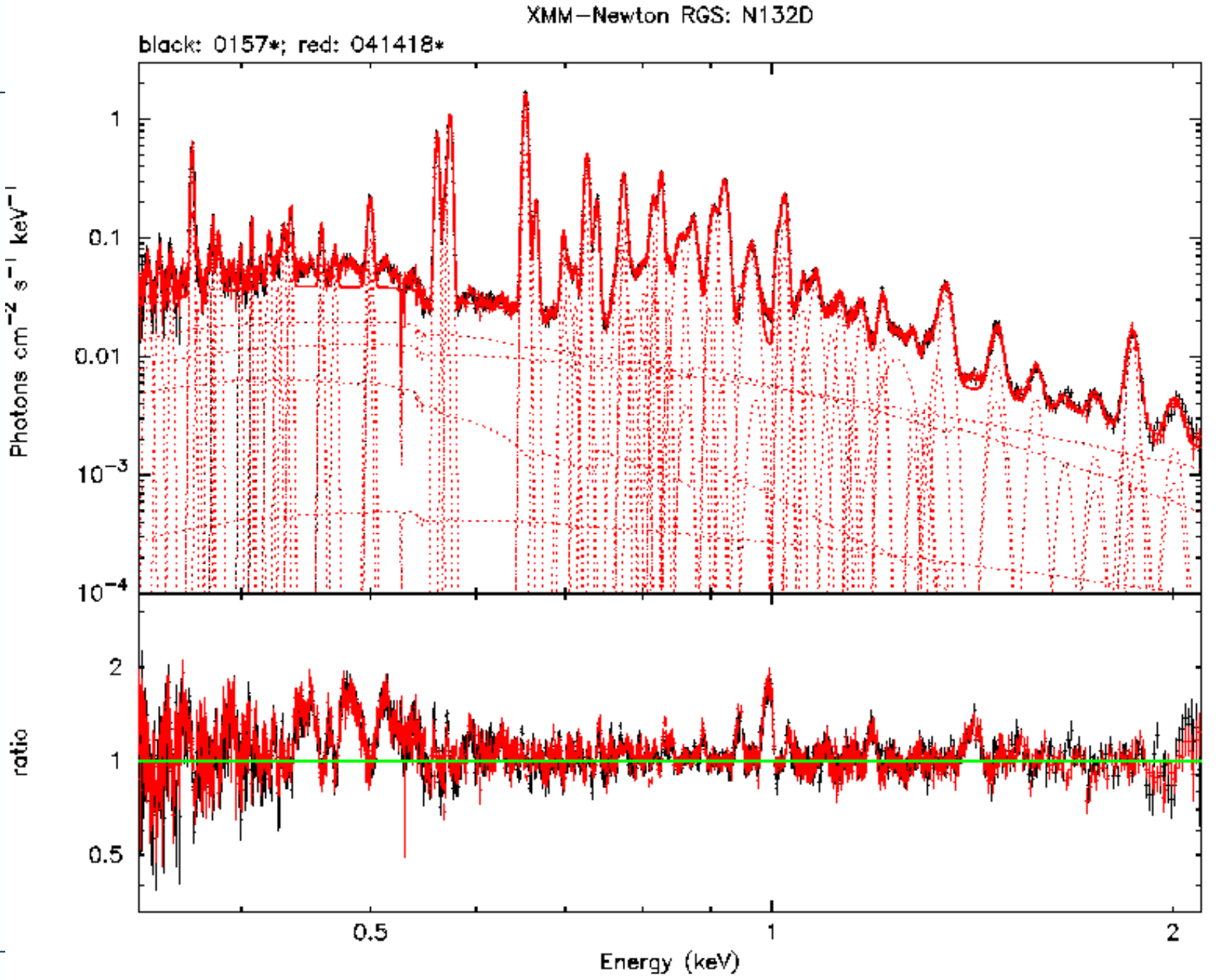
Modelling

Current model:

Renormalised Suzuki-continua.

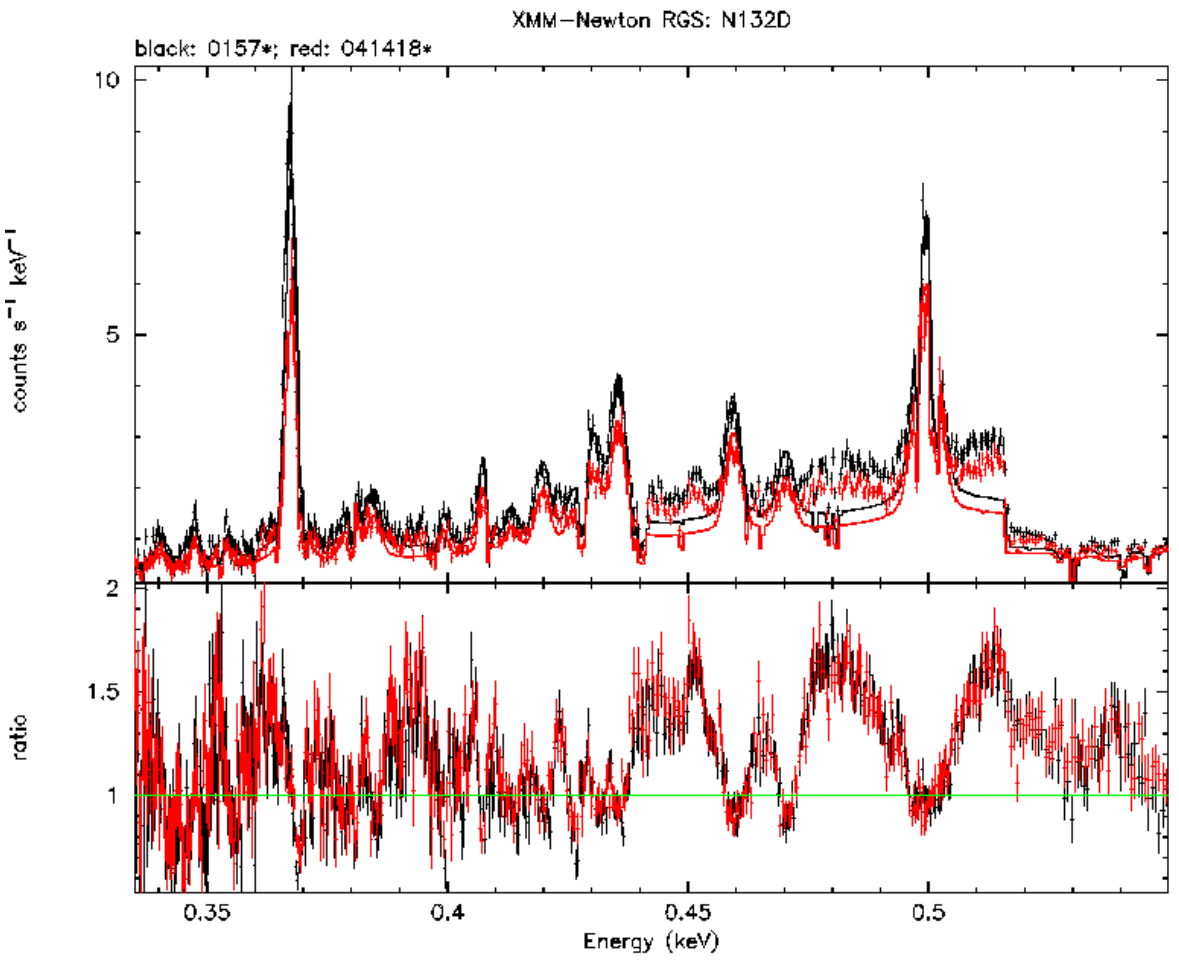
Still unmodelled line blends for E < OVII.

Continua are likely underestimated for E > O VIII.

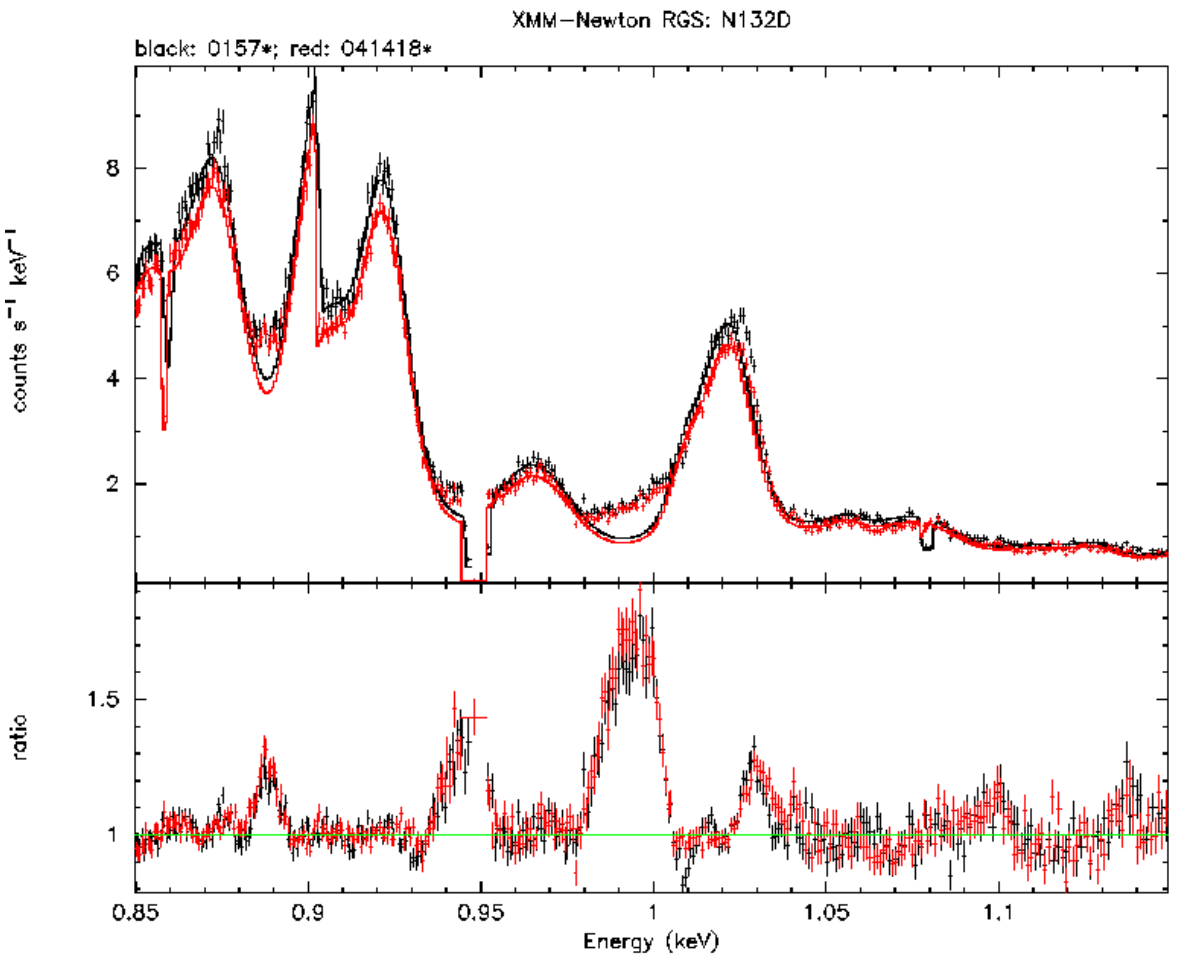


Modelling

Long wavelength end:



Ne X neighbourhood:



Future planning

Continua:

- Review transferred Suzuki et al. values (normalisation conversions, rounding/precision, abundances). Model does not include high energy continuum.
- Fit with some TBD linked line normalisations.

Emision lines:

- As, unfortunately, XRISM will not provide the list of resolved lines, we still need to speculate about all the (Iron) line blends.
- Basic consistency check (especially Fe) via AtomDB data.
- Semi-automatic line parameter and parameter link handling.

Documentation!