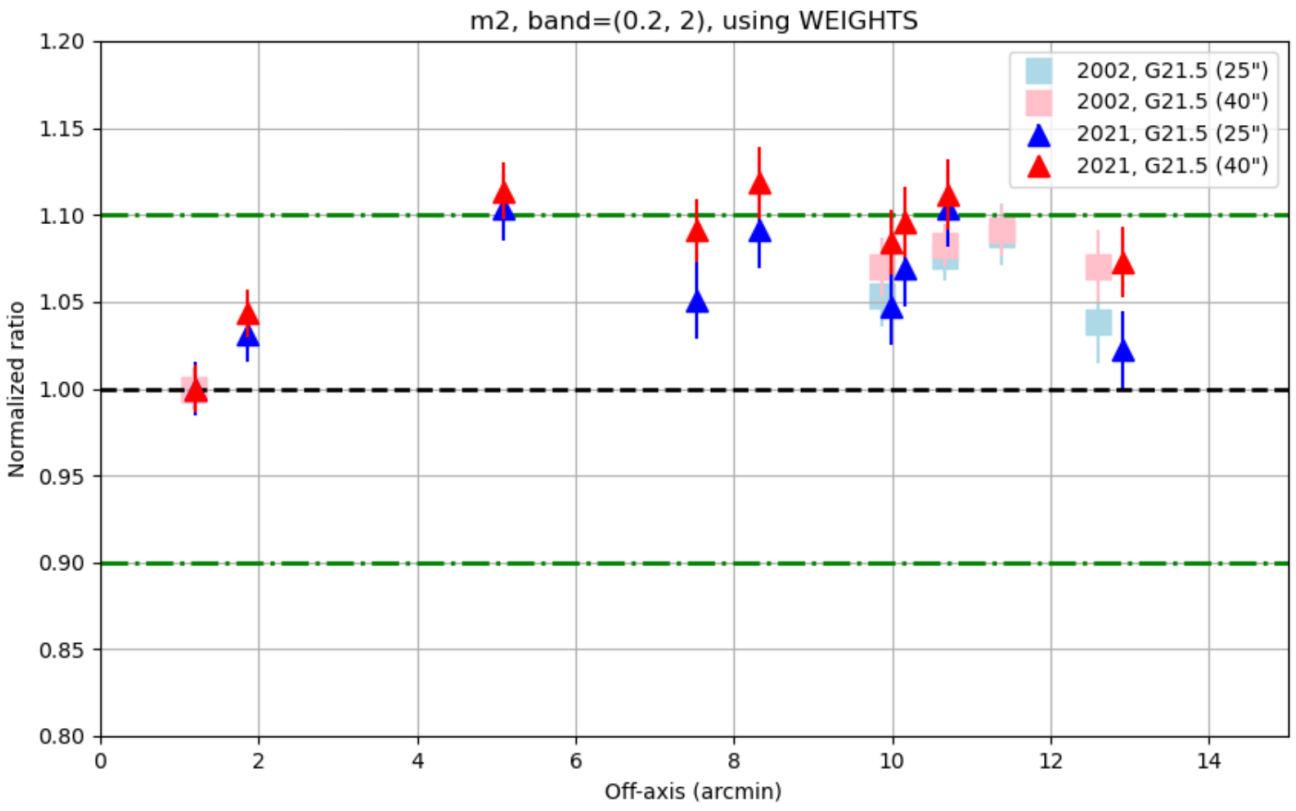
EPIC flux stability

Ivan Valtchanov, XMM SOC, SCO-04

XMM-Newton EPIC CAL meeting, 22-23 May 2023

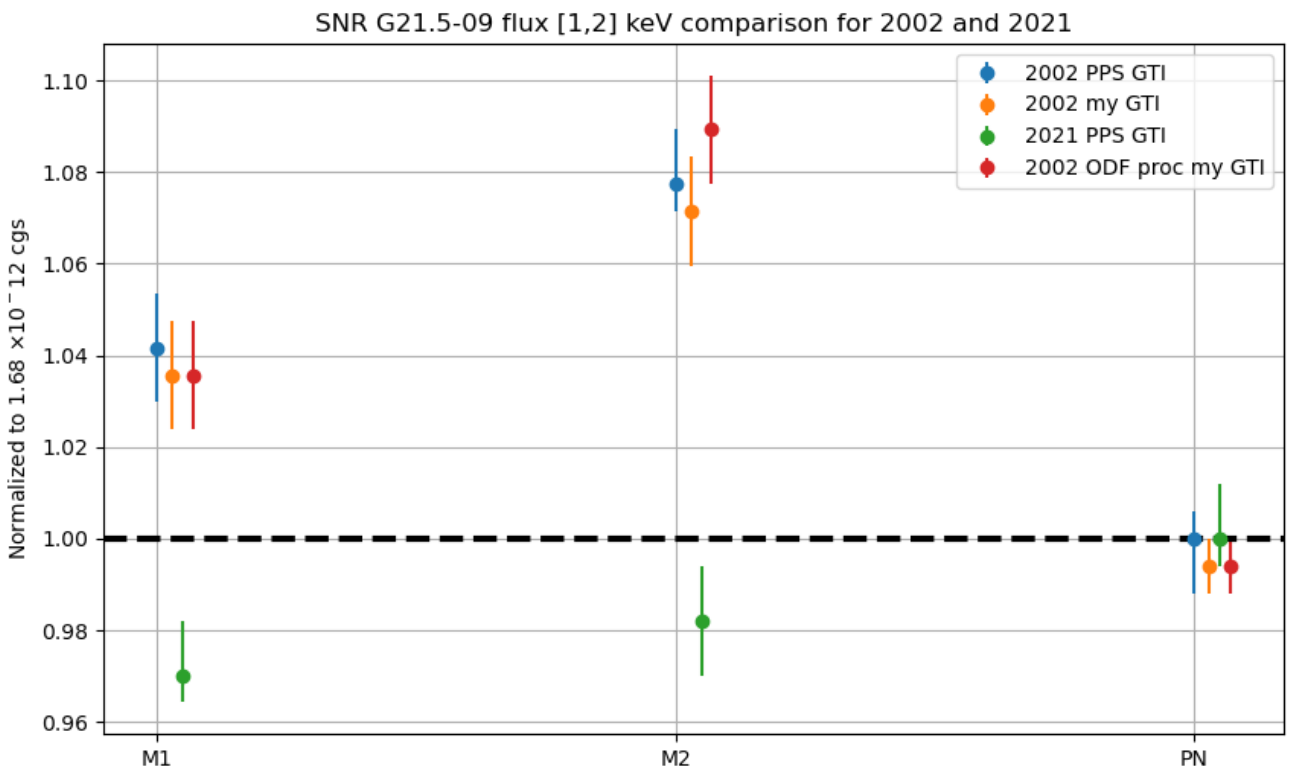
Background information



MOS2 vignetting analysis with SNR G21.5

Results dependent on epoch of the two on-axis observations:
2000 (**rev. 60**) or 2021 (**rev. 3892**)

SNR G21.5-09, boresight (previous results with SAS20)



Comparing alternative processing options.

- PPS products and GTI
- My GTI and PPS products
- Starting from ODF

MOS2/PN ~ 8% higher for 2002

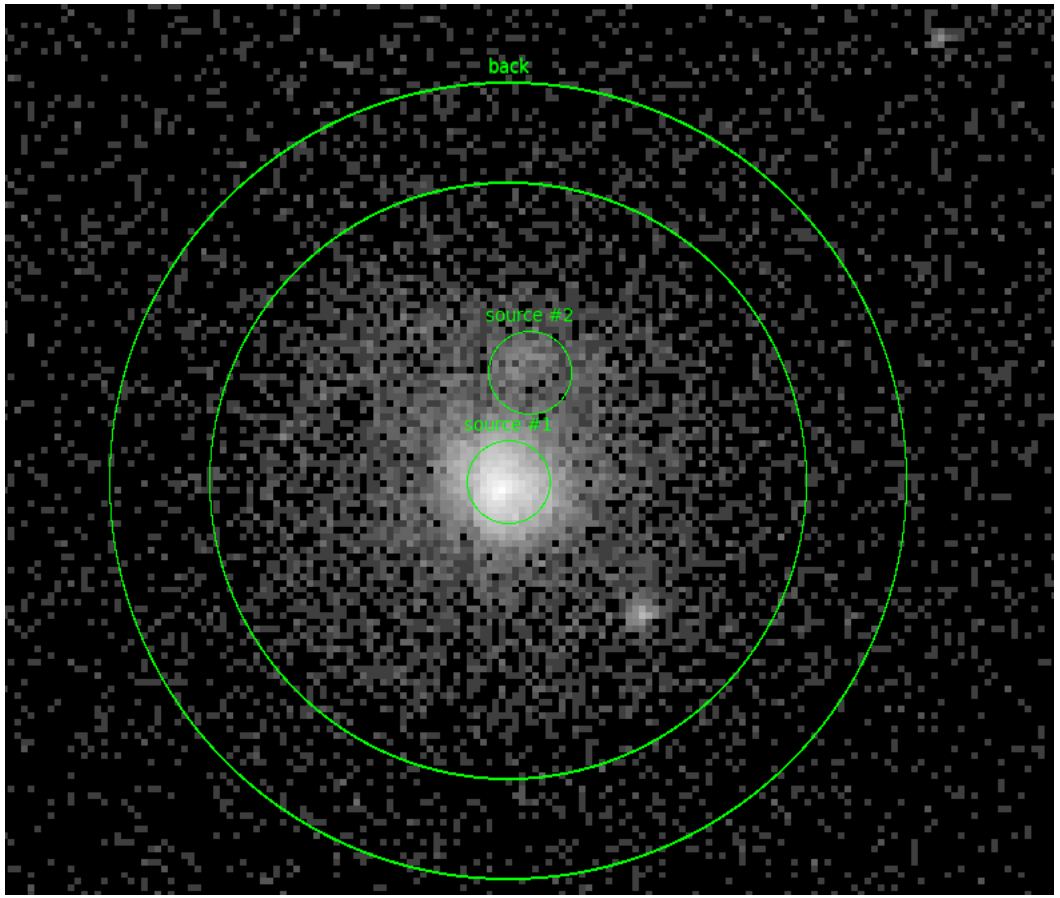
Note energy range in [1,2] keV

Investigating flux PDFs as function of epoch

- All observations have the target centre at the boresight,
  - Were processed in an identical way
  - Source and background regions were the same (in sky coordinates)
- Fluxes derived using XSPEC per camera spectral fit

- Targets in this update: SNR G21.5-09 and Abell 0133

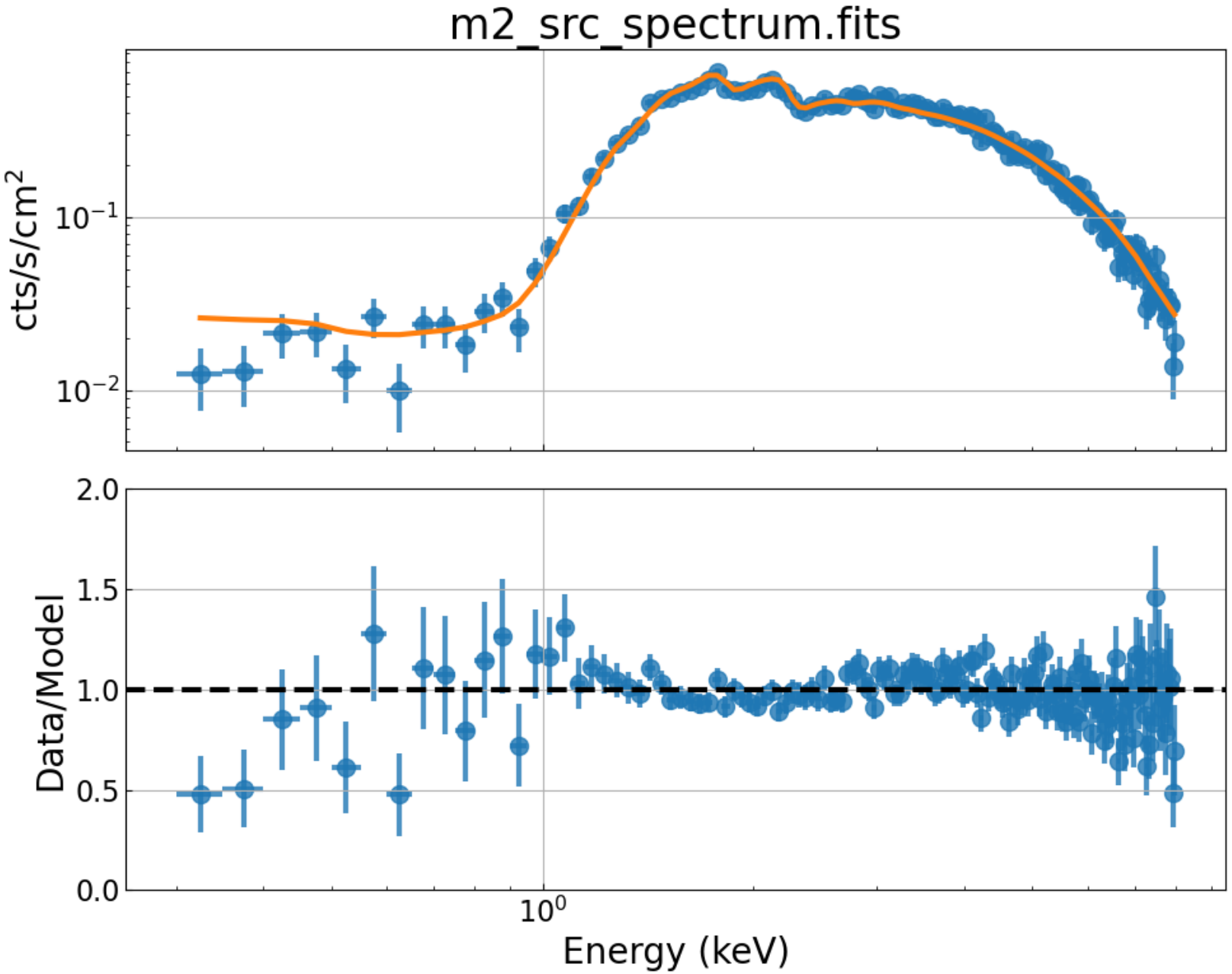
Source and background regions, MOS2



Fixed in RA, Dec

Source #1 at boresight

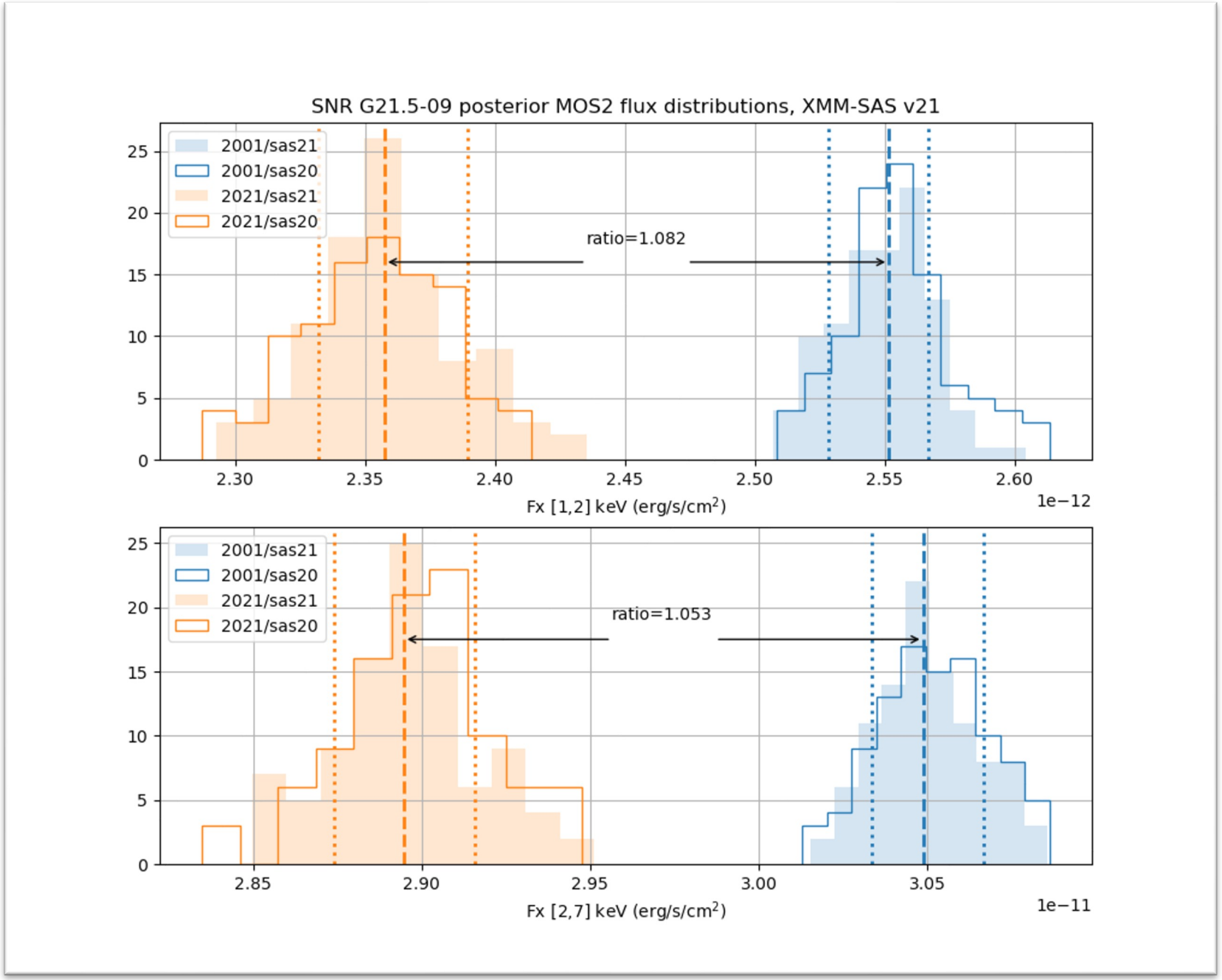
ARF generated for extended source



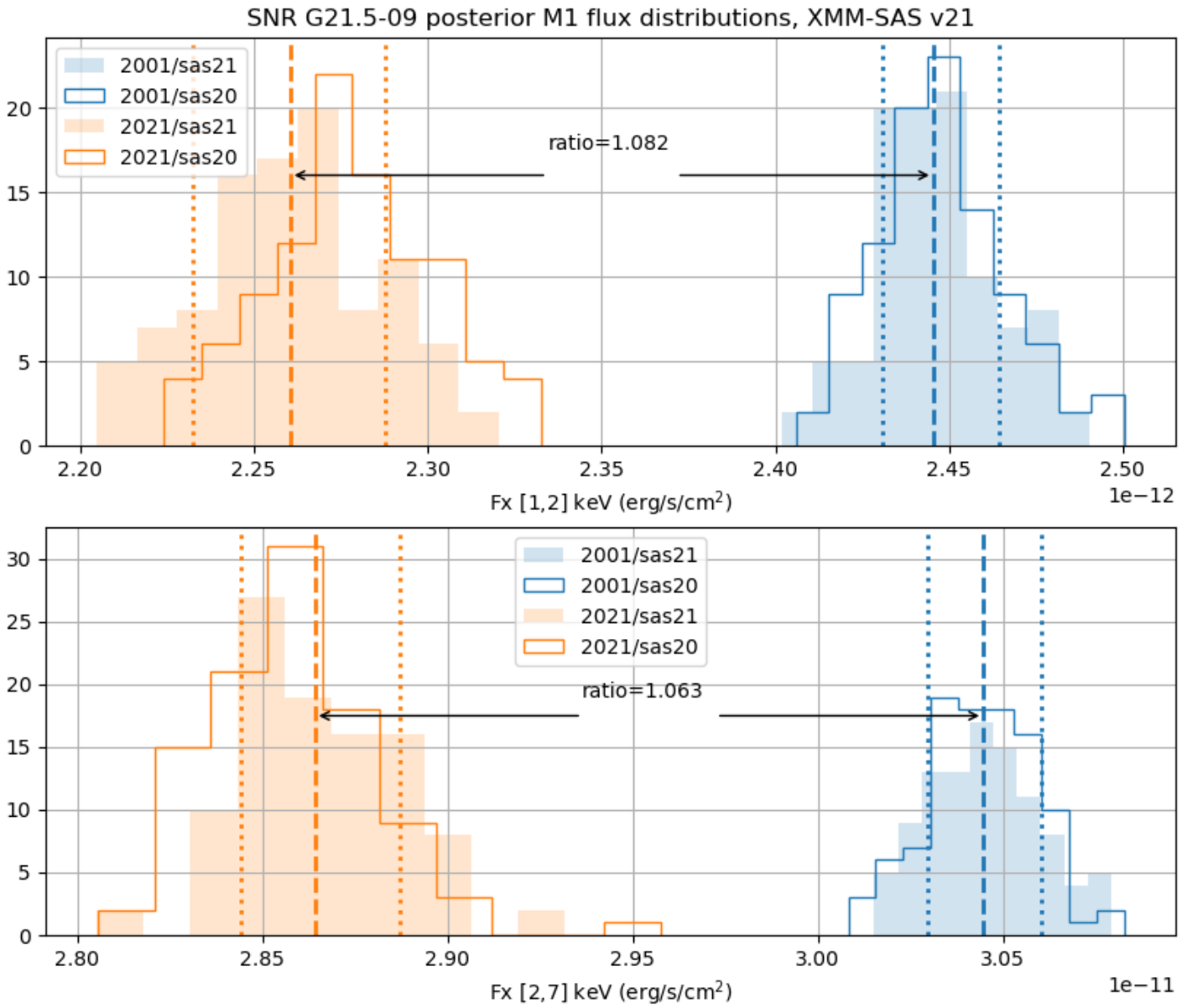
`TBabs*pegpwrl`

Flux with BXA in
[1,2] keV and [2,7] keV

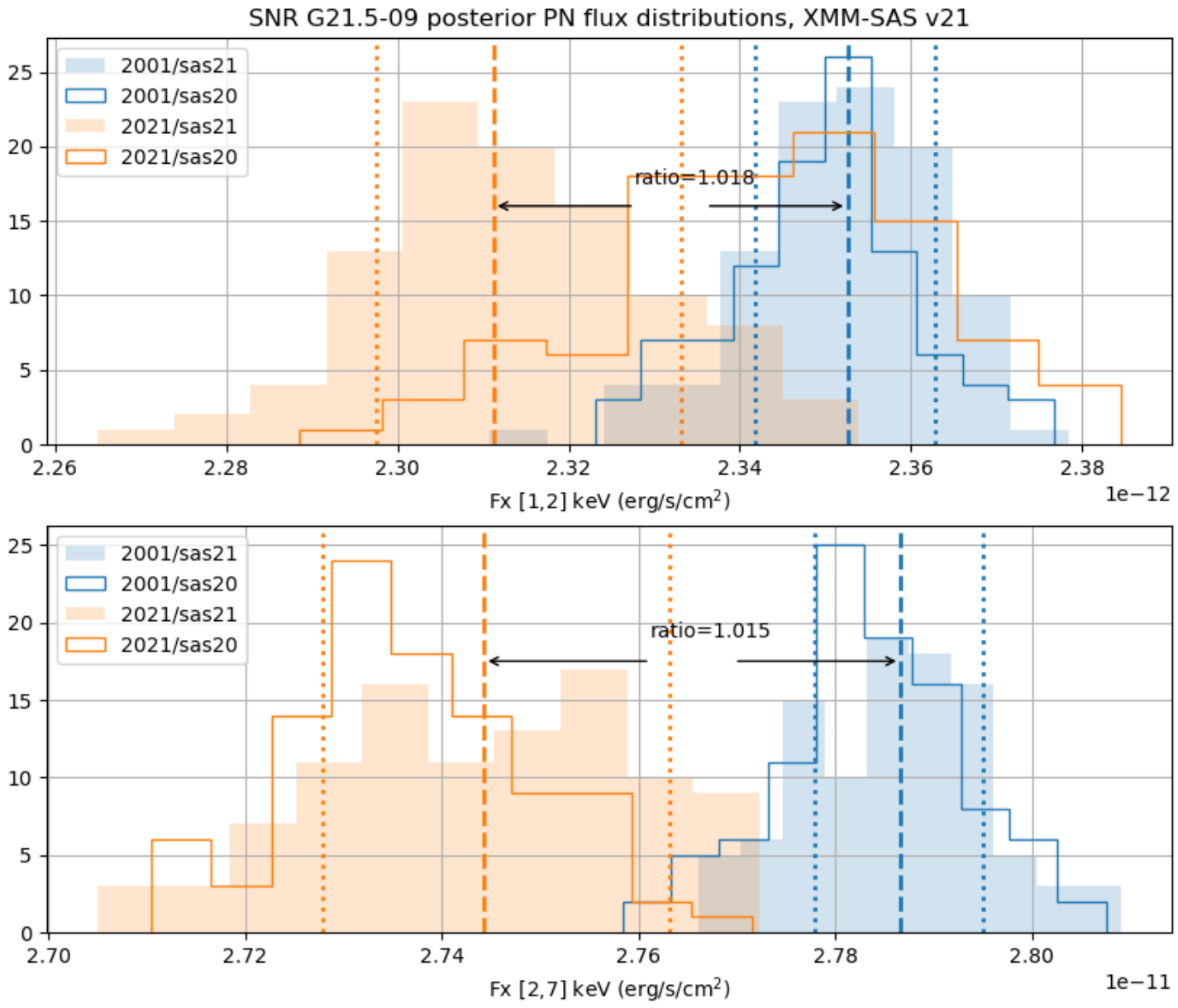
G21.5 Flux PDF MOS2

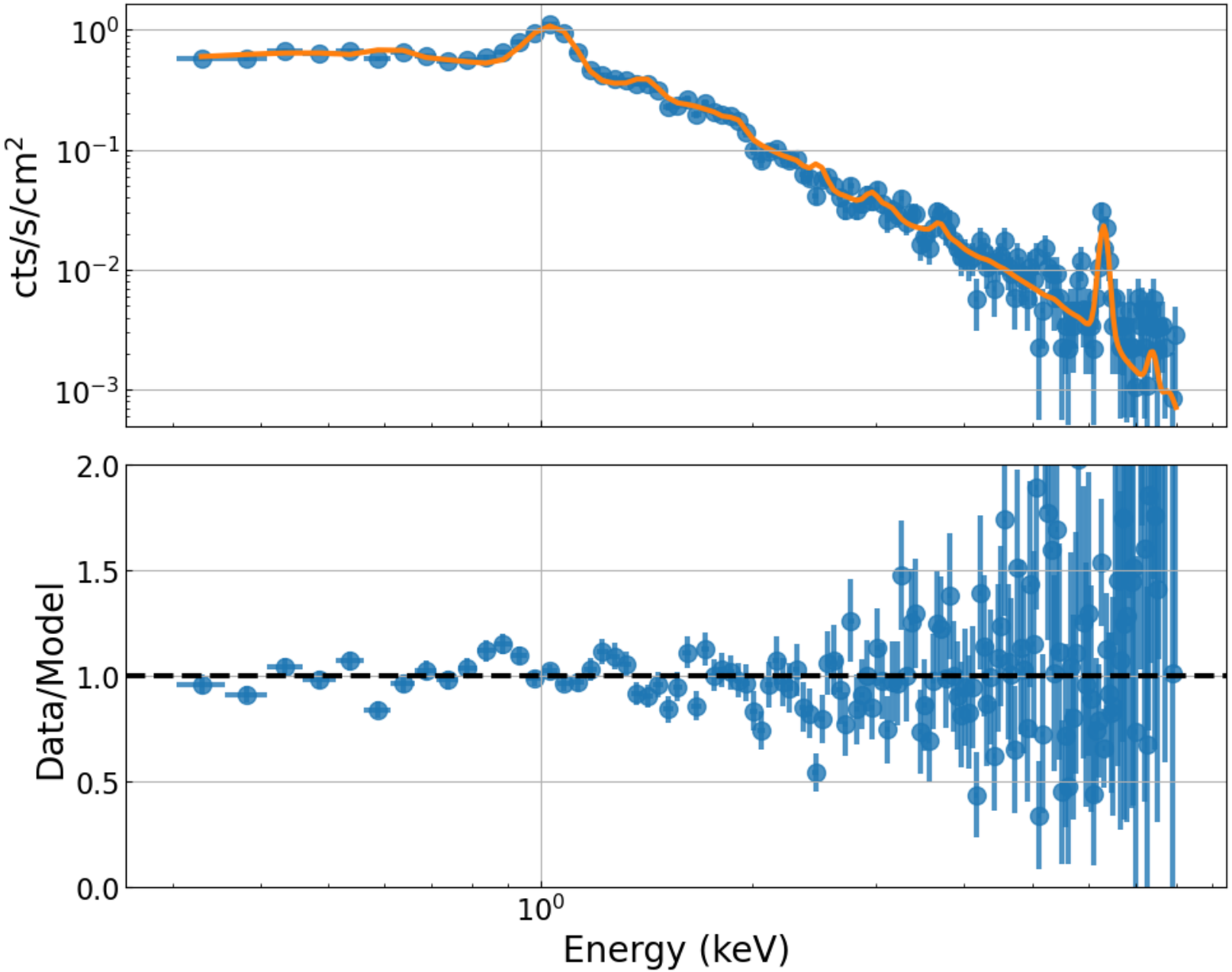


G21.5 Flux PDF MOS1



G21.5 Flux PDF PN





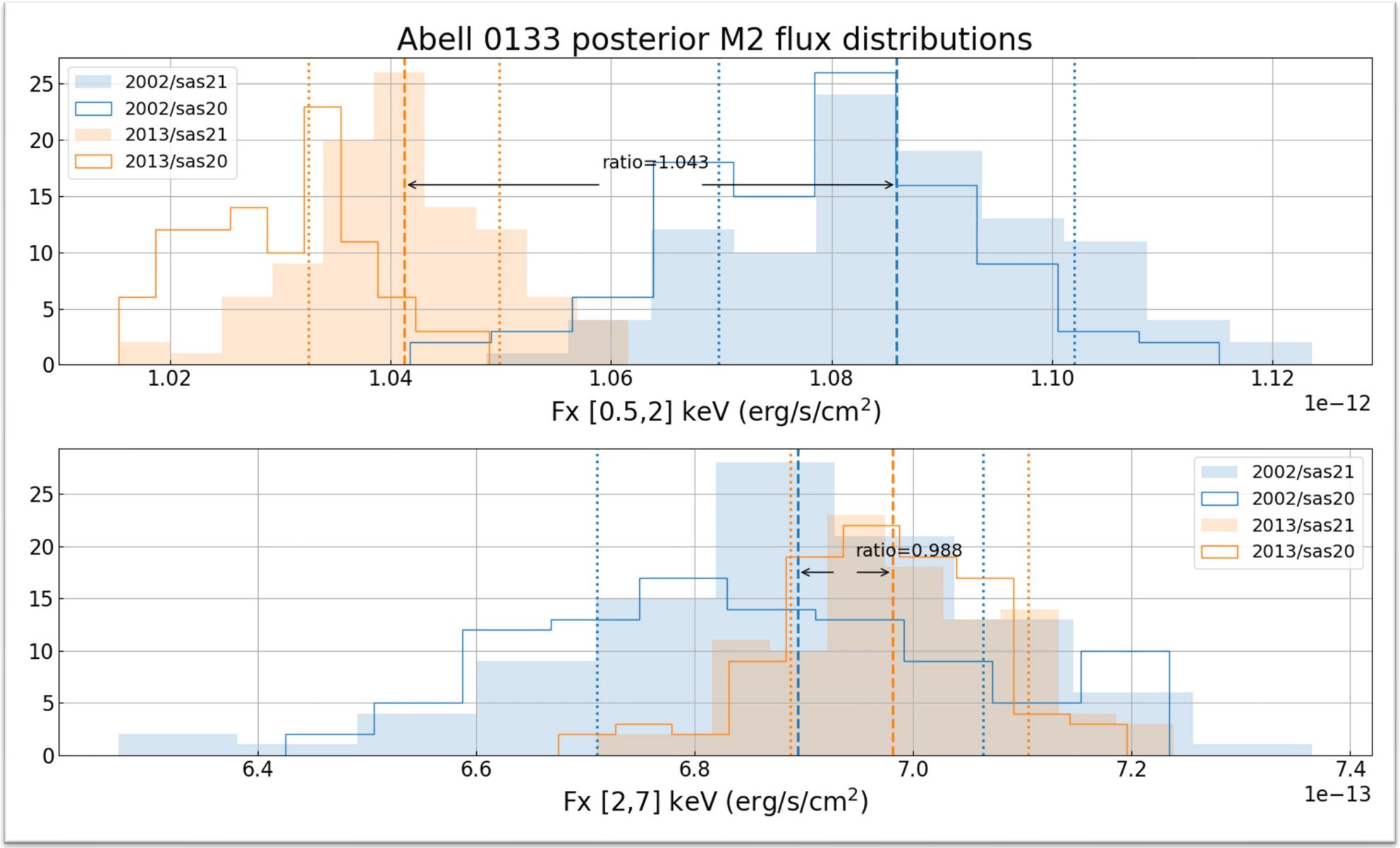
Abell 0133

`Wabs * APEC`

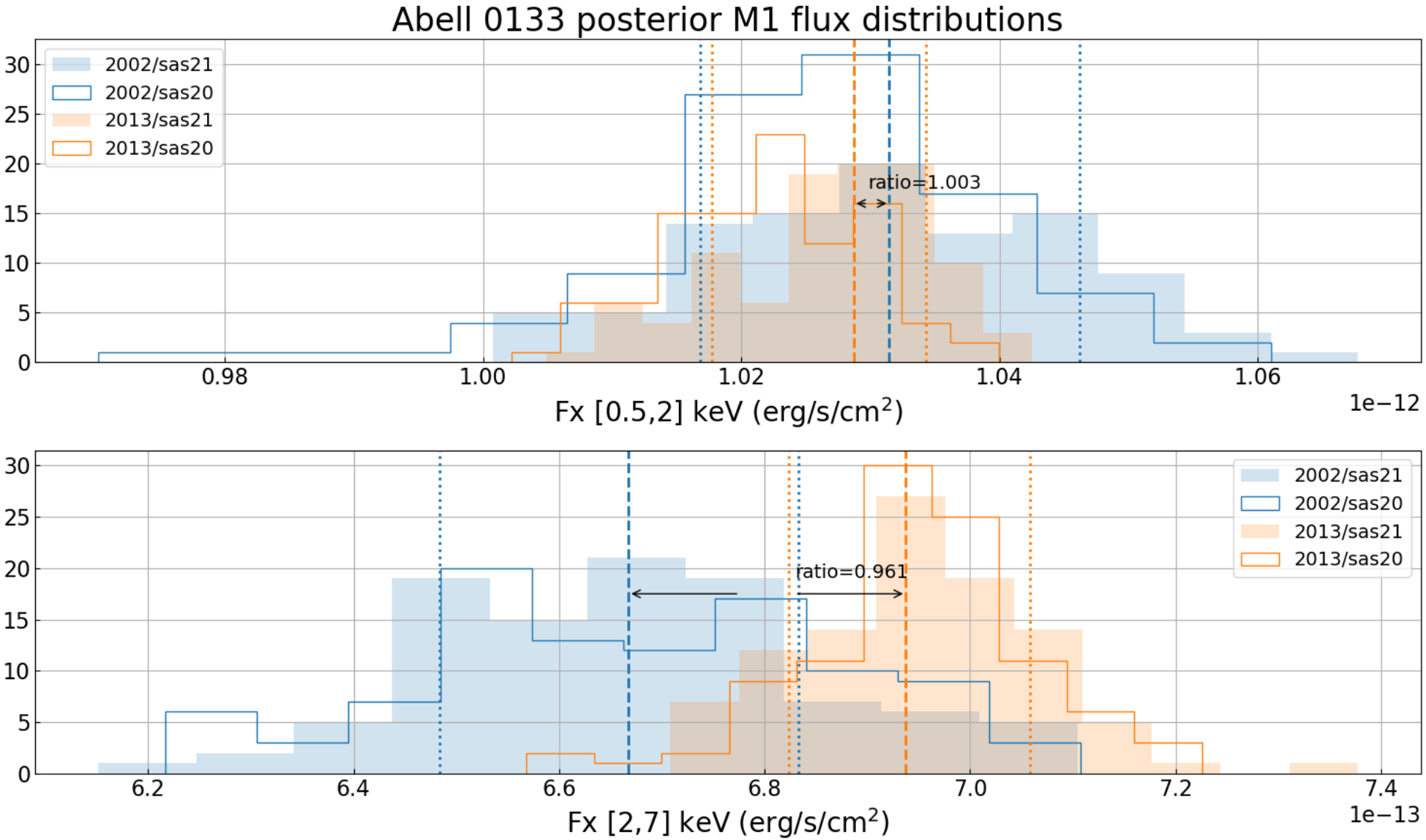
Two obs:

2002 (**rev. 556**)
2013 (**rev. 2471**)

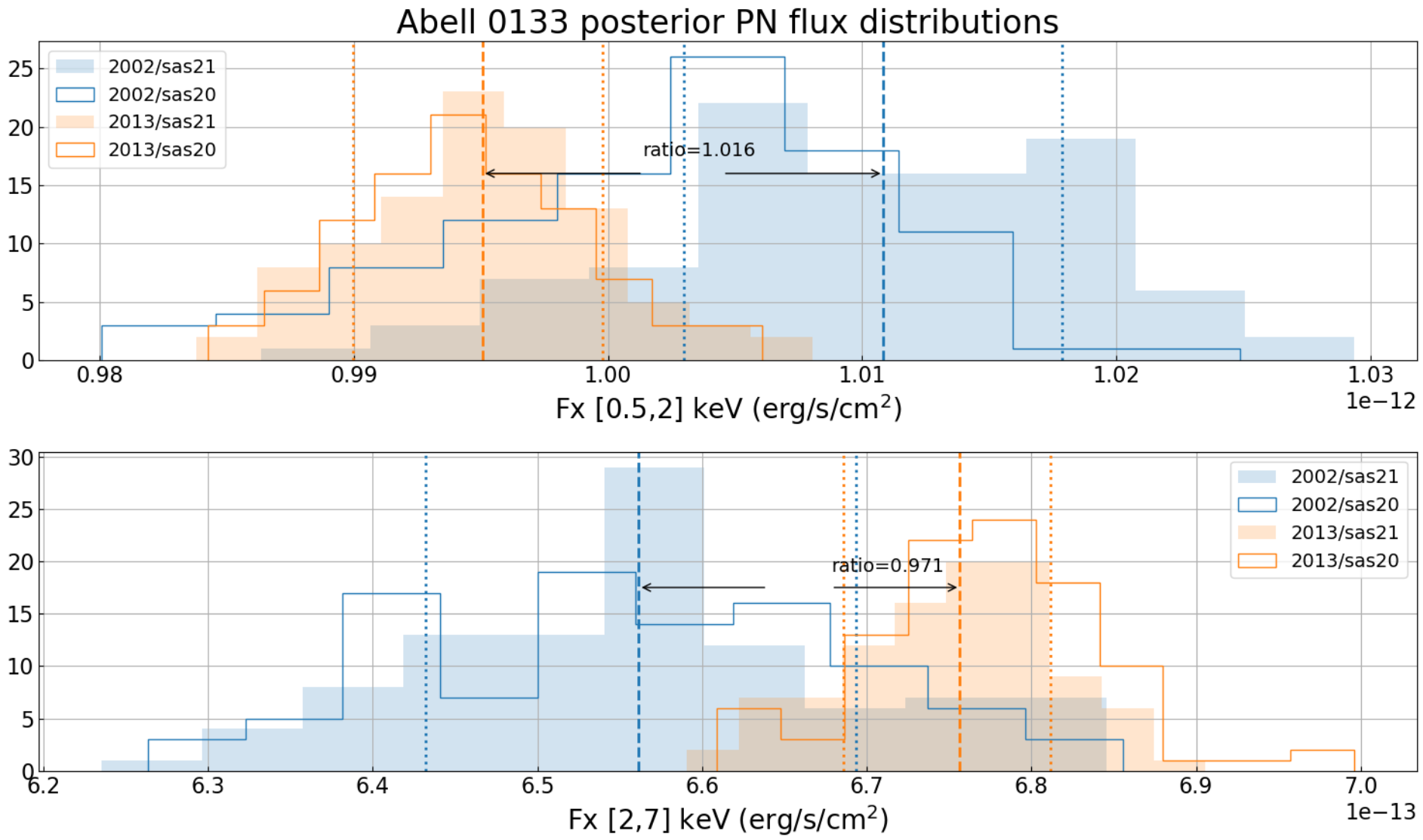
Abell 0133 Flux PDF MOS2



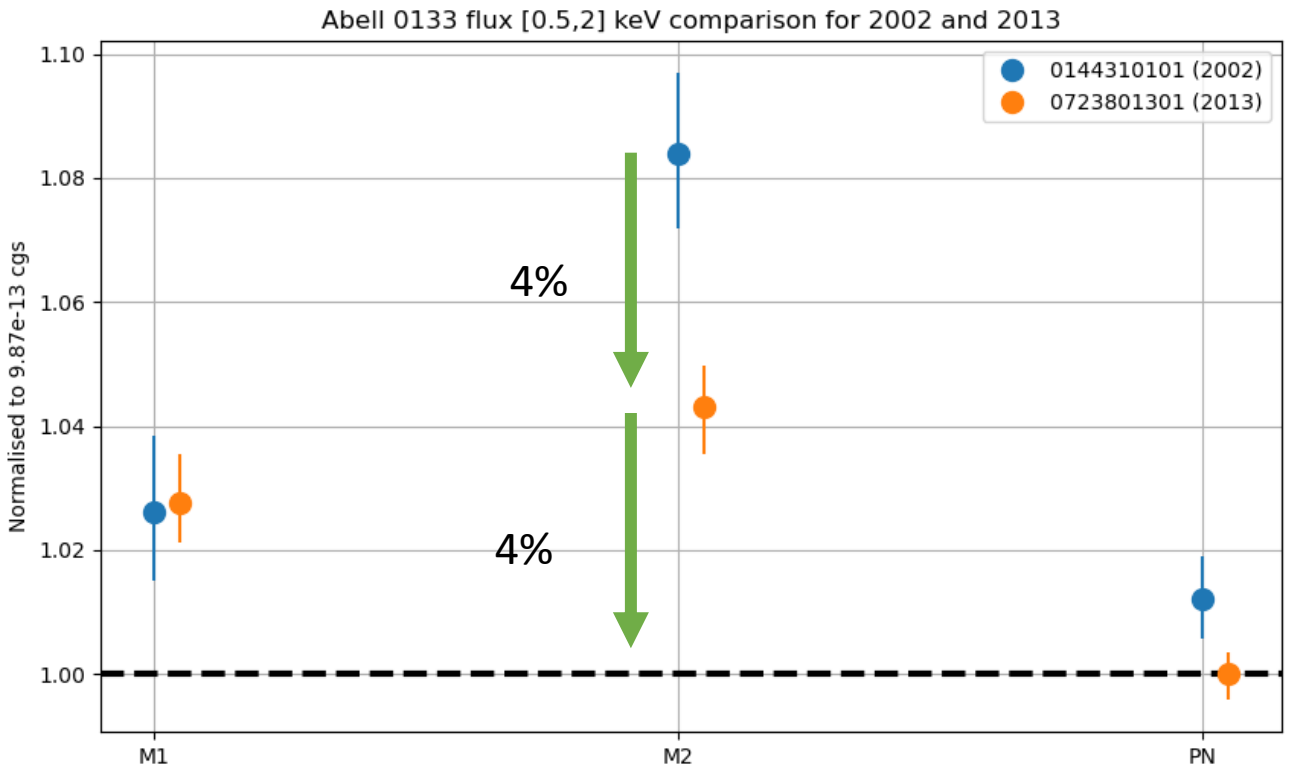
Abell 0133 Flux PDF MOS1



Abell 0133 Flux PDF PN



MOS2 to PN flux in Abell 0133



SAS20 processing

Presented in 2022

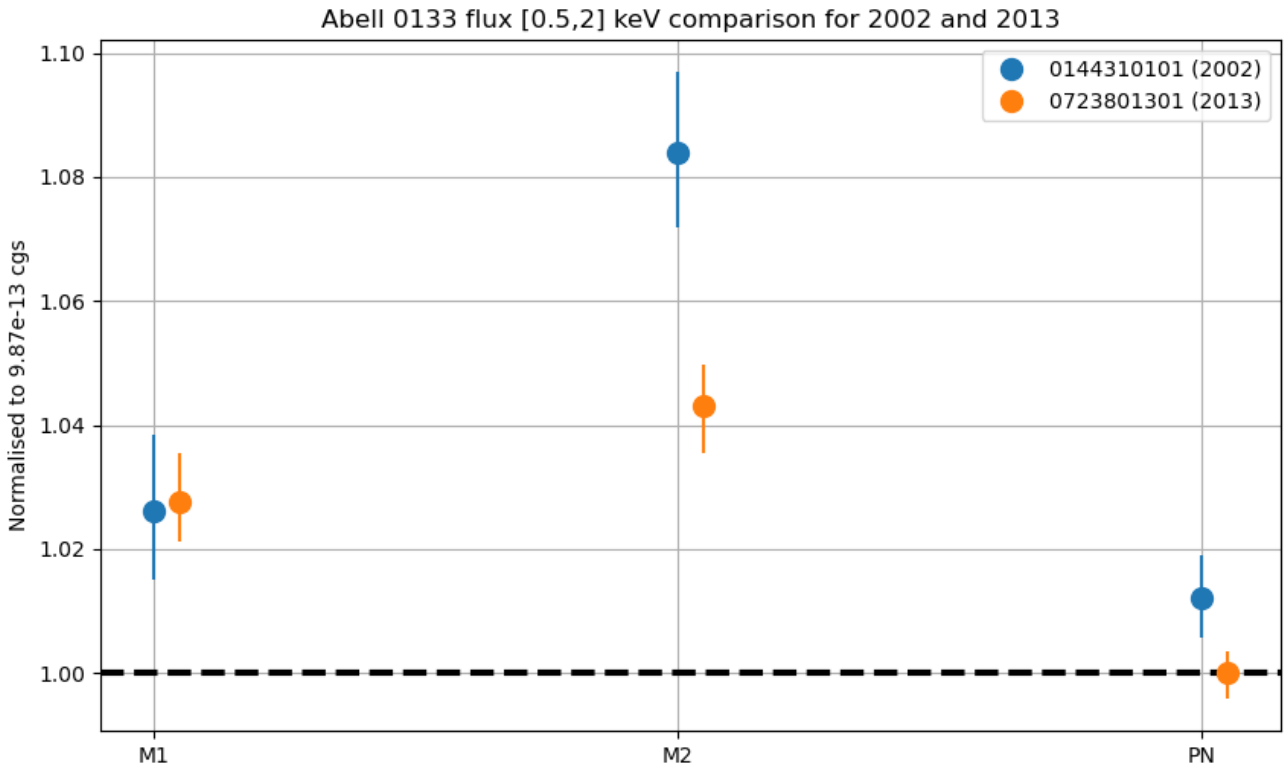
Conclusions

- MOS2 flux PDFs for 2000 and 2021 show that there is a problem in both G21.5 and A0133
- MOS1 flux PDFs are sometimes ok and sometimes not, depending on source and band.
- PN seems consistent, regardless of the source or band under analysis
- **Further analysis with a larger sample of same stable target observed with baseline of 15-20 years difference.**

What to do when this is re-confirmed?

The end

Abell 0133, boresight



MOS2/PN ~8% higher in 2002

Note energy range in [0.5,2] keV