

LabX 2023

*What happened to the
Seyfert 1.5 NGC 3783?*



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Target i.d.

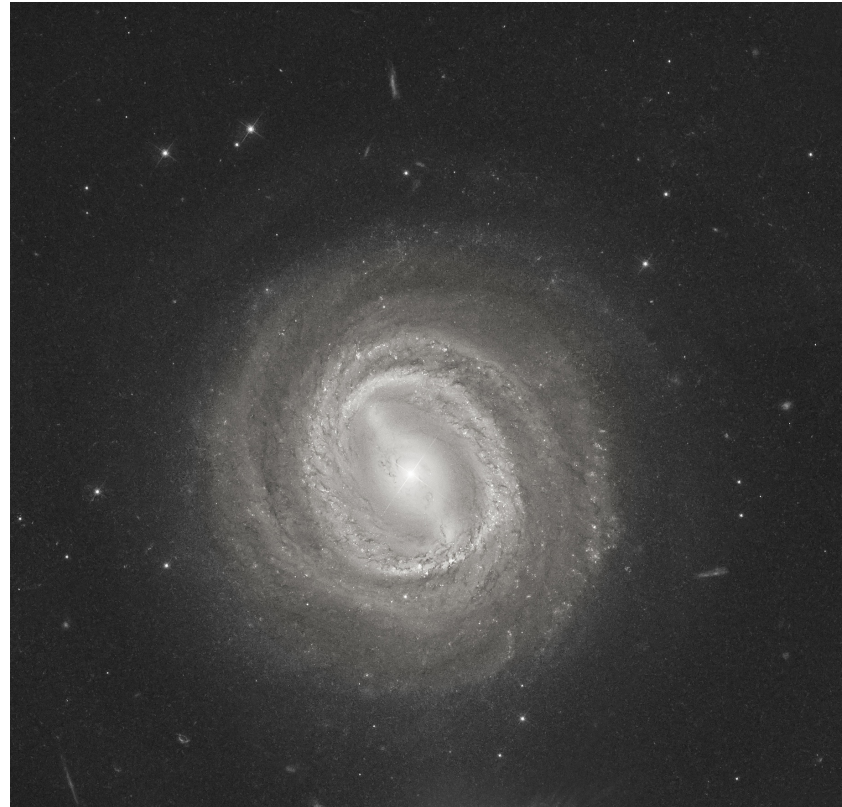
Object type: G

Morphology: (R')SB(r)ab

Activity Type: Sy 1.5

$z \approx 0.009371$

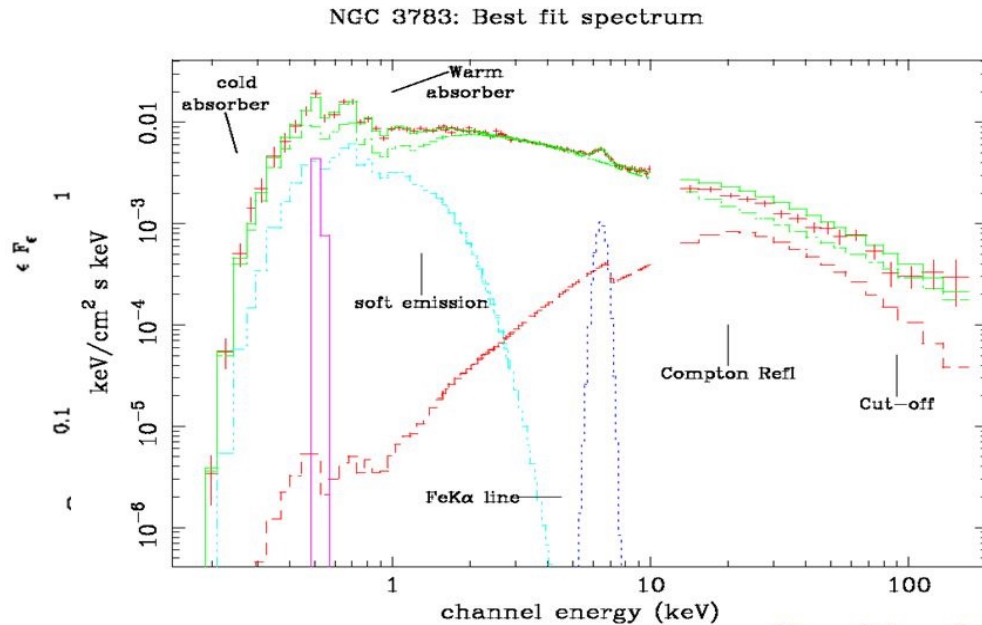
$M_{bh} = 3.0 \pm 0.5 \times 10^7 M_{\odot}$ (Peterson et al. 2004)



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The complex X-ray spectra

Very “typical” Seyfert 1 X-ray spectrum measured in all the X-ray observations



1) Very low cold absorption (in the UM scenario, it indicates that the putative dusty torus is not intercepting the line of sight. Ok for a type I AGN)

2) Fe line and reflection component detected → OK with the presence of accretion disk!

3) High-E cutoff measured at $E \approx 100$ keV: OK with thermal Comptonization

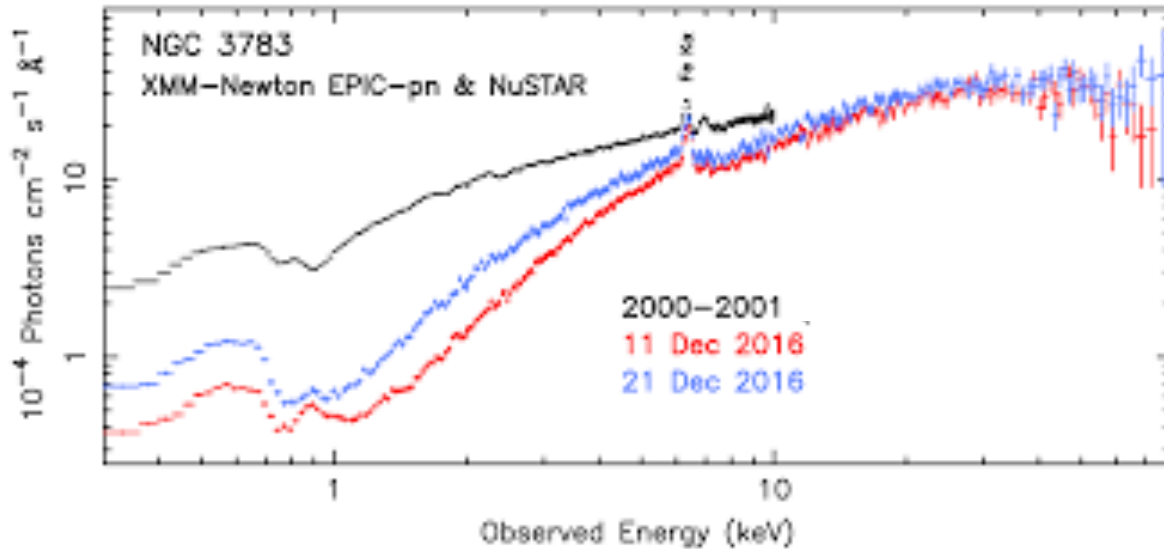
4) warm absorber measured: → ok with UM and presence of warm electrons along the polar axis of the system to explain measurement of broad lines in polarized light (optical)

**Broad-band *BeppoSAX*
observation NGC 3783.**

De Rosa et. al 2002

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Goals



Reference papers:

De Rosa et al., 2002, A&A, 387, 838

Mehdipour et al., 2017, A&A, 607, 28

- 1) Is the source stable during the observation? (light-curve in the whole band and in different bands? Evidences of spectral variations? - >Ratios?)
- 2) What are the properties of the primary emission of NGC 3783? (what's the spectral shape? What are the values of the parameters? Flux? Luminosity?)
- 3) Is the source absorbed? How? (Quantity and quality?)
- 4) Property of the Fe K α line (E? EW? Width?)

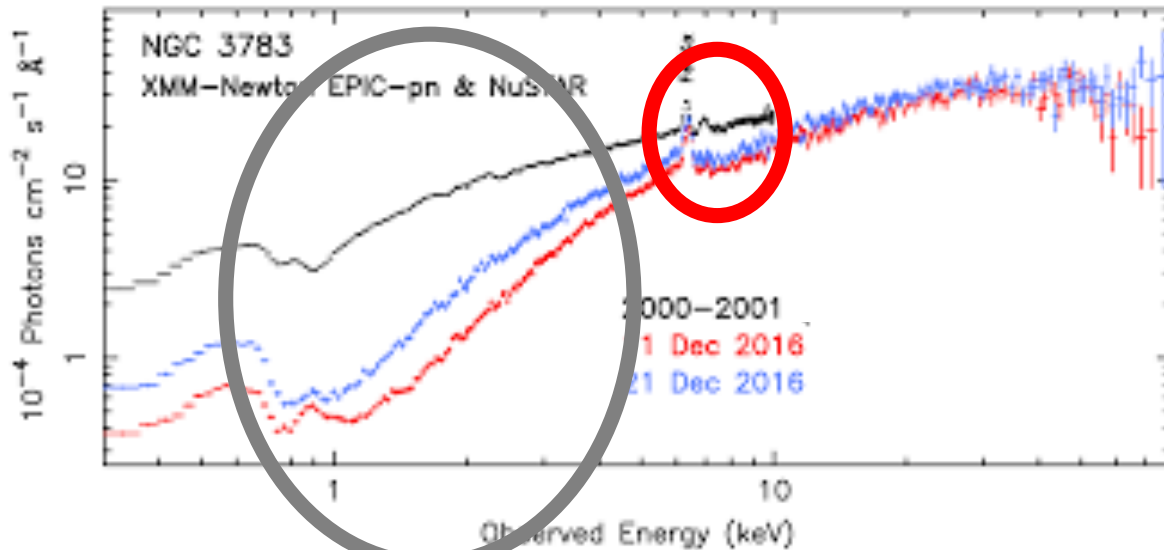
Are these properties in agreement with the predictions of UM for AGN?

Can I interpret these changes within the UM scenario? How?

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How

Mandatory part



a) use only one XMM-Newton observation

b) use only EPIC/pn data in the 3-10 keV band

c) perform data reduction and spectral analysis to study:

c-0) light-curves

c-1) shape of the primary continuum;

c-2) column density and properties of the absorber

c-3) properties of the FeK α line

Reference papers:

De Rosa et al., 2002, A&A, 387, 838

Mehdipour et al., 2017, A&A, 607, 28

Optional part

d) re-do everything on the other observation, then compare and discuss the differences!

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Nucleus [*XMM-Newton, pn, 3-10 keV, two states*]

Mandatory (a) data reduction, (b) extraction of the lightcurve, (c) X-ray spectral analysis and property of the absorber and iron K α emission line

[Optional] Similarly for the other observation/spectral state

