Anatomy of the AGN in NGC 5548

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on behalf of the NGC 5548 consortium (P.I. J. Kaastra)
http://www.issibern.ch/teams/ngc5548/

Kaastra et al., “A fast and long-lived outflow from the supermassive black hole in NGC 5548”, 2014, Science

AGN 11, Trieste, 23-26 September 2014
Timeline of the multi-wavelength campaign on NGC 5548

main goal: study of the warm absorber...
Obscured UV/X-ray spectrum during summer 2013
X-ray light curves 2005-2014

long-lasting obscuration
UV absorption lines in the HST/COS spectrum of summer 2013
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1-6: WA velocity components

+ broad absorption troughs
UV absorption lines in the HST/COS spectrum of summer 2013

1-6: WA velocity components

+ broad absorption troughs correlated with X-ray obscuration
WA (less ionized) + 2 UV/X-ray obscurers

Obscurer 1:
- $n_H \sim 10^{22} \text{ cm}^{-2}$
- $cF \sim 0.8$
- $\log(\xi) = -1.2$

Obscurer 2:
- $n_H \sim 10^{23} \text{ cm}^{-2}$
- $cF \sim 0.3$
- $\log(\xi) < -4$
• partial covering
• velocity
  \( \sim -1000 \text{ km/s} \)
• variability
  over \( \sim \) days

 Possibly a disk wind
(i) Reflection component: consistent with being constant \(\Rightarrow\) distant material (>light months)

\[ \Gamma(\text{pexmon})=1.9, \quad E_c(\text{pexmon})=300 \text{ keV}, \quad \text{Norm}(\text{pexmon})=5.5 \times 10^{-3} \]
(ii) Primary continuum: variability of $\Gamma$ and cut-off energy

In one observation (#6), we find the measure $E_c = 70^{+40}_{-10}$ keV
(iii) Absorption variability
(iv) Test of Comptonization model (compps) on average X-ray spectrum:

\[ kT = 40^{+40}_{-10} \text{ keV} \]

\[ \tau = 2.7^{+0.7}_{-1.2} \]
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$kT = 40^{+40}_{-10}$ keV  $\tau = 2.7^{+0.7}_{-1.2}$

work in progress...
See Kaastra et al. (2014); some papers in preparation:

- Mehdipour et al.: global model for the broadband SED
- Mehdipour et al.: long-term variability
- Ursini et al.: the high-energy view with XMM, NuSTAR and INTEGRAL
- Cappi et al.: EPIC data analysis
- Di Gesu et al.: short-term variability
- Ursini et al.: test of Comptonization models

A nice movie by the Lead Level Artist of Assassin’s Creed™:
https://www.youtube.com/watch?v=67S-F95igvU