Variability study of Seyfert AGNs

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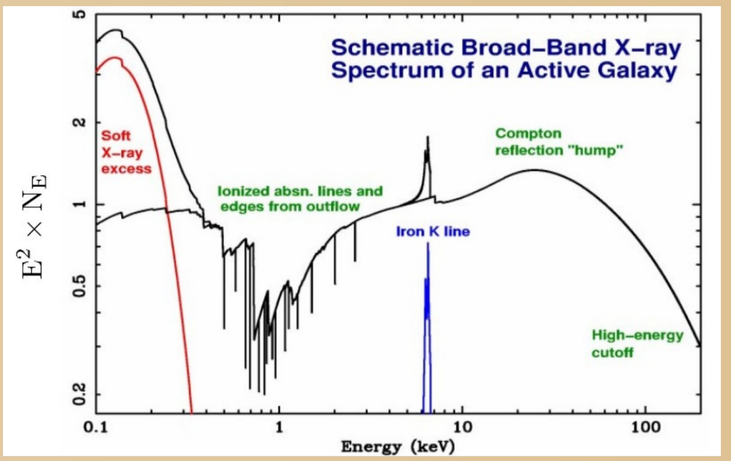
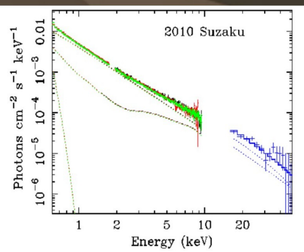
Satellite Data: Suzaku, XMM-newton, Nustar and Swift

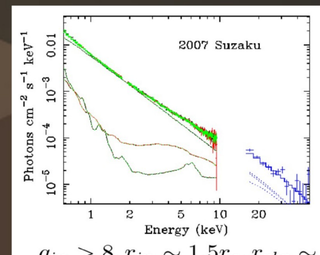


Seyfert 1H 0419-577

Variable X-ray reflection (Main Pal & GCD 2013)



$q_{in} \sim 8, r_{in} \sim 1.5r_g, i \sim 50°$



$q_{in} > 8, r_{in} \sim 1.5r_g, r_{rbr} \sim 2.2, q_{out} \sim 5, i \sim 50°$

1. Blurred reflection fits the full band including Soft excess (Suzaku, XMM) better than PCA. (Contrary to Pounds et al 2004b)

Spectral variability (Main Pal & GCD 2013)

FeK line flux – 10^{-5} ph/s/cm^{-2}
PL flx- 10^{-11} ergs/s/cm^{-2}

Powerlaw continuum and reflection both are variable.

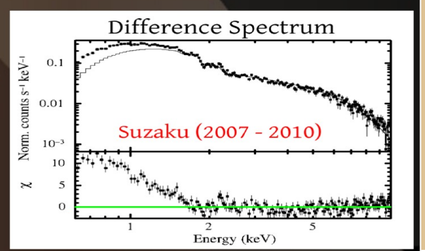
Difference spectrum shows consistency with blurred reflection.

Inconsistent with Fabian et al 2005

More clear picture is required- Simultaneous X-ray/UV/Optical

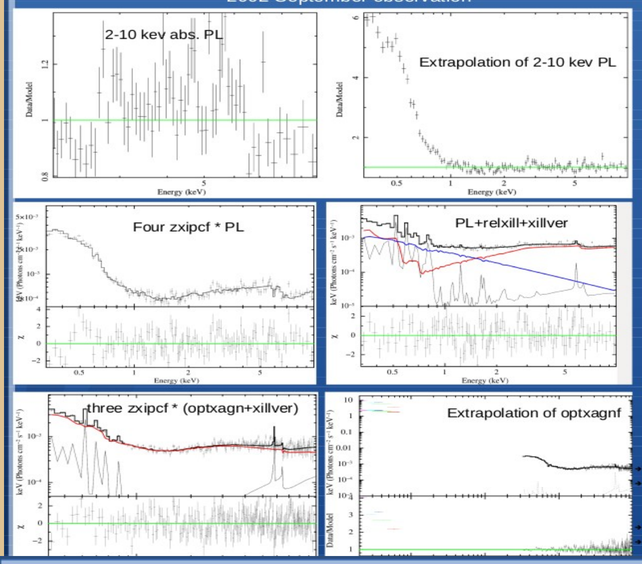
Suzaku

Parameter	January 2010	July 2007
$f_{FeK\alpha}$	0.5 ± 0.2	$1.3^{+0.5}_{-0.4}$
$f_{0.6-2\ keV}$	0.98	1.25

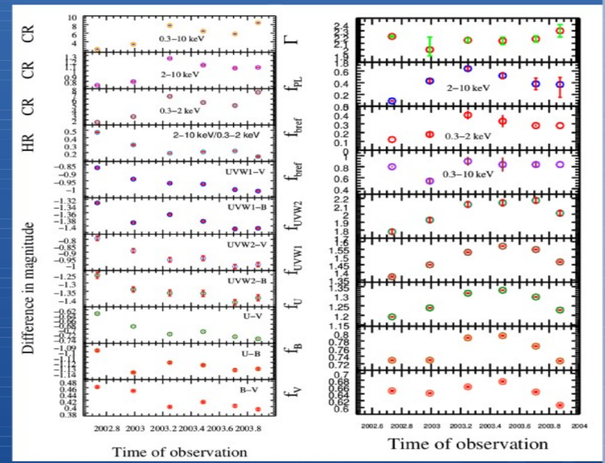


UV/Optical emission and its relationship with X-rays in Seyfert 1H 0419-577 (to be submitted)

Seven XMM-Newton data sets which have imultaneous X-rays and UV?optical coverage
2002 September observation



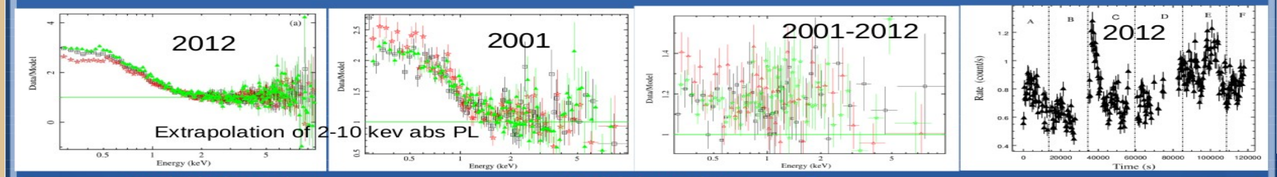
Model independent and dependent study



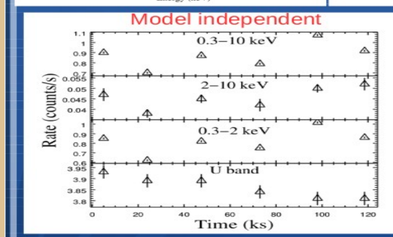
- Reflection and Comptonization provides better description
- The compact corona remains within few gravitation radii (~3 rg).
- Soft X-ray excess and PL vary with simialr Fvar~40% and Fvar increases from low to high energy from ~3 to 40 %.
- Correlation studty shows strong realtion between X-ray and UV/optical.
- Comptonization may not be the driver of variability due to constant photon index and

X-ray/UV emission and the origin of soft X-ray exces from a NLS1 II Zw 177 (under communication in MNRAS)

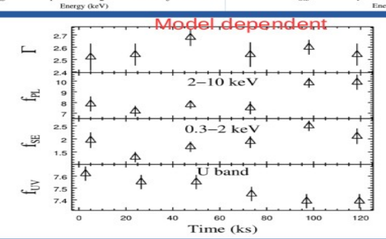
- 2012 (~137 ks) and 2001 (~11 ks) XMM-Newton observation.
- Long observation has simultaneous coverage in UV band .
- Both observation show strong soft excess.

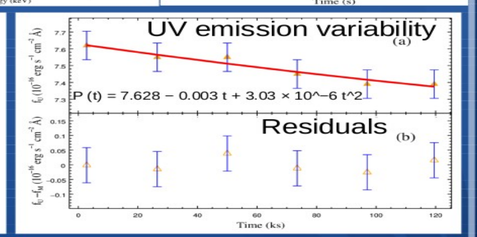


Model independent



Model dependent

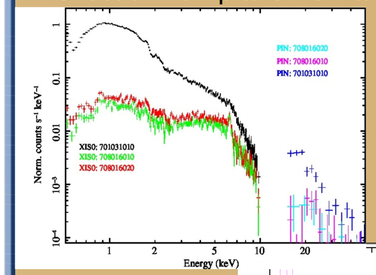




- Reflection and Comptonization describe both observation well and 2001 shows slightly higher photon index.
- For short term variability, powerlaw and soft excess is correlated and UV varies diffrently. Predicted UV is smaller than observed by a factor of ~8. To model disc emission , it requires higher mass larger by a factor of 5 given in literature.
- UV emission may not be dominated by X-ray reprocessing and could be associated to accretion rate in the intrinsic disc.

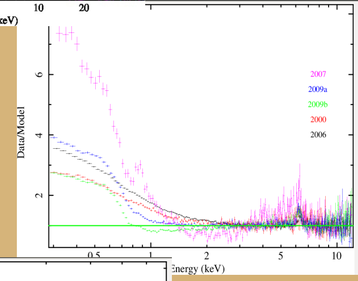
Mrk 335 (in preparation)

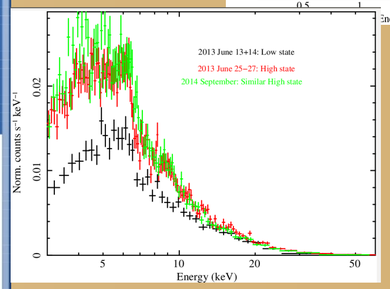
- All available XMM, SUZAKU , Nustar and Swift observation show strong soft excess.
- All observation have simultaneous covergae of UV/Optical data.
- To test association of soft excess with reflection component components such as reflection hump and Fe-Ka line



Suzaku observations

XMM -Newton observations





Nustar Observations

Importance of workshop

- NGC 3516 : Variations in Fe-K absorbers and relationship with spectral componets
- UTA feature and 2-5 curvature using Mrk 766 and MCG 6-30-15