12953 - Catching AGN in Deep Minimum States to Unveil Their Core Environment

Cycle: 20, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) NGC-985	COS/FUV	2	06-Aug-2013 21:01:14.0	yes

2 Total Orbits Used

ABSTRACT

The deep minimum state of AGNs is characterized by a strongly suppressed or even absent primary continuum. As the continuum disappears weak spectral features like relativistic iron lines or narrow soft X-ray emission lines from ionised plasmas become highly significant and their parameters can be determined. Therefore deep minimum states offer unique possibilities to investigate in detail the physics of the reprocessed components in AGN, including the immediate vicinity of the supermassive black hole. Applying our experience (several deep minimum observations) we propose

two triggered 10ks XMM snapshot, one 80ks XMM follow-up and one HST (2 orbit) observation of an AGN in deep minimum state. We will identify deep minimum states based on Swift and XMM-Newton slew observations.

OBSERVING DESCRIPTION

We will use COS/FUV to observe UV absorption lines in the spectrum of the Seyfert 1 galaxy NGC-958 (2 consecutive orbits). We will use G130M grating to observe the Lya and NV lines and the G160M to observe the C IV emission line. The AGN is currently in a low state, with a measured flambda_0=1.e-14 erg/s/cm2/Ang at lambda=1800 Ang. Since the AGN emission is evolving with time, we are considering large uncertainties on the target flux: for our ETC calculations we are considering a flat spectrum normalized respectively to flambda_0, and, for the limiting cases, to flambda_max=1.e-13 erg/s/cm2/Ang, and flambda_min=2.e-15 erg/s/cm2/Ang.

ACQUISITION: The target has precise 2MASS coordinates (ICRS reproduced with an error < 0.1").
We are acquiring the target using an ACQ/PEAKXD+ACQ/PEAKD sequence with the G130M grating and an exposure time of 33 seconds. With these settings we will be able to successfully acquire the target (S/N~40) even if the flux is five times fainter than the one currently observed. At the same time, the target acquisition will be safe even if the source is ten times brighter than expected.

Configuration	Flux	EXP time	Max cts/s/pix	Total rate	Buffer Time	COS ETC ID
G130M/1327	flambda_min	33 s	0.096	419	561	COS.sa.524960
G130M/1327	flambda_max	33 s	0.116	2627	675	COS.sa.524962

EXPOSURES: To ensure a continuous coverage of the wavelengths of interest we are adopting two different central wavelengths per grating: G130M, cen-wave=1309,1327; G160M, cen-wave=1577,1600. For each setting, we are further considering two different FP-POS (G130M/1309, FP-POS=1,2; G130M/1327, FP-POS=3,4; G160M/1577, FP-POS=1,2; G160M/1600, FP-POS=3,4) in order to appropriately correct for COS grid wires and improve the flat fielding. During our first orbit we will execute 4x426 s exposures (total exposure time of 1952 s) with the G130M grating, while during our second orbit we will execute 4x573 s exposures (total exposure time of 2292 s) with the G160M grating. Using a flat continuum spectrum normalized to flambda_0 for our ETC simulations, we obtain a resulting S/N~11.5 per resolution elements for both configurations (S/N~8 in the gap regions). To further test the safety of the observations we have run ETC simulations after normalizing the flat spectrum to flambda_max:

Configuration	Flux	EXP time	Max cts/s/pix	Total rate	Buffer Time	COS ETC ID
G130M/1327	flambda_max	426 s	0.116	3427	688	COS.sp.525081
G160M/1577	flambda_max	573 s	0.021	2182	1080	COS.sp.525083

REAL TIME JUSTIFICATION

We have been monitoring AGNs with Swift and in the XMM Slew Survey to identify possible targets which are in the ``deep minimum" state, i.e. with flux over an order of magnitude lower than during ROSAT observations. From these candidates we will choose two targets for short snap-shot observations with XMM-Newton. If we indeed find them to be in the deep minimum state, we will trigger a long XMM observation and the HST observation.

We will notify STScI when we choose our initial target which will likely be the HST target. This will be confirmed after the short XMM observations. The long XMM observation and the HST observations will be coordinated; this is necessary to observe the target at about the same flux state. The two observations can be within a week of each other.

Visit

Proposal 12953, Orbit1 (01), implementation Wed Aug 07 01:01:24 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/FUV

Special Requirements: SCHED 100%

Diagnostics

(Orbit1 (01)) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-985	RA: 02 34 37.8820 (38.6578417d) Dec: -08 47 17.02 (-8.78806d) Equinox: J2000		V=14.28 flambda=1.e-14 erg/s/cm2/Ang @ 1800 Ang	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC-985_peakxd (COS.sa.524958)	(2) NGC-985	COS/FUV, ACQ/PEAKXD, PSA	G130M 1327 A				33 Secs (33 Secs) *[==>]*	*[1]*
2	NGC-985_peakd (COS.sa.524958)	(2) NGC-985	COS/FUV, ACQ/PEAKD, PSA	G130M 1327 A	CENTER=FLUX-WT-FLR; NUM-POS=5.0; STEP-SIZE=0.9			33 Secs (33 Secs) *[==>]*	*[1]*
3	NGC-985_G130_1 (COS.sp.525080)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=3; BUFFER-TIME=316; FLASH=YES			426 Secs (426 Secs) *[==>]*	*[1]*
4	NGC-985_G130_2 (COS.sp.525080)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=4; BUFFER-TIME=315; FLASH=YES			425 Secs (425 Secs) *[==>]*	*[1]*
5	NGC-985_G130_3 (COS.sp.525080)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=1; BUFFER-TIME=316; FLASH=YES			426 Secs (426 Secs) *[==>]*	*[1]*
6	NGC-985_G130_4 (COS.sp.525080)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=2; BUFFER-TIME=314; FLASH=YES			424 Secs (424 Secs) *[==>]*	*[1]*
7	NGC-985_G160_1 (COS.sp.525082)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=1; BUFFER-TIME=463			573 Secs (573 Secs) *[==>]*	*[2]*
8	NGC-985_G160_2 (COS.sp.525082)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=2; BUFFER-TIME=462			572 Secs (572 Secs) *[==>]*	*[2]*
9	NGC-985_G160_3 (COS.sp.525082)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FP-POS=3; BUFFER-TIME=463			573 Secs (573 Secs) *[==>]*	*[2]*
10	NGC-985_G160_4 (COS.sp.525082)	(2) NGC-985	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FP-POS=4; BUFFER-TIME=458			568 Secs (568 Secs) *[==>]*	*[2]*

Orbit Structure