



18225 - Do true Seyfert 2 galaxies truly exist ? The case of NGC 3660

Cycle: 33, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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Dr. Frederic Marin (CoI) (ESA Member)	Universite de Strasbourg I
Dr. Ismael Garcia Bernete (CoI) (ESA Member)	Centro de Astrobiologia - CAB

VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) NGC-3660	STIS/CCD STIS/NUV-MAMA	4	05-Feb-2026 10:00:14.0	yes

4 Total Orbits Used

ABSTRACT

True Seyfert 2 galaxies are active nuclei with no optical/UV/IR broad emission lines that are simultaneously unabsorbed in X-rays and variable, demonstrating a direct view of the inner nucleus. The detection of optical and UV broad lines in the prototypical Seyfert 2 galaxy NGC 3147 in narrow-slit HST spectra has however questioned the very existence of the population as a whole. We propose here a joint XMM-Newton and HST program on one of the best remaining true Seyfert 2 candidates - NGC 3660 - with the goals of (I) searching for a broad, so far undetected, H α emission line using narrow-slit HST spectroscopy, and (II) deriving a high quality intrinsic nuclear SED using quasi-simultaneous observations. The program has the potential of settling once and for all the debate on the existence of true Seyfert 2 galaxies in general.

OBSERVING DESCRIPTION

In order to achieve our goals, we request narrow-slit optical spectra around H α using STIS/CCD and the G750M grating and optical/UV imaging with STIS/NUV-MAMA. We will use the 52x0.1 arcsec slit to reduce host galaxy contamination by a factor of ~ 10 with respect to ground based observations and to increase the contrast of any broad line component against both the stellar continuum and the superimposed narrow lines, which are mostly produced in the extended (kpc-scale) narrow line region (0.1×25 pc at $z = 0.012$). We replicate the highly successful strategy that led to the discovery of a broad H α in NGC 3147 (right panel of Fig. 1) by our team. The pointing will be aimed at the host galaxy photocenter. A target acquisition image with the F28X50LP will be taken to allow recentering on the brightest region, where we expect the AGN to be located, with exposure of 60 s, appropriate for the expected surface brightness of ~ 15 mag arcsec $^{-2}$. To avoid missing the AGN at the center of the galaxy nucleus, we will obtain 5 spectra, as done for NGC 3147 (GO15225, PI: Bianchi). The first will be centered at the location derived following the acquisition image. The following will be taken with a POS-TARG of (+0.1,0.0), (+0.2,0.0), (-0.1,0.0), (-0.2,0.0).

We performed accurate S/N simulations using the STIS ETC. The stellar continuum within the 0.1 \times slit is expected to be $F_{\lambda} \sim 2 \times 10^{-16}$ erg cm $^{-2}$ s $^{-1}$ \AA^{-1} , using the information derived from ground based spectra. The resulting S/N is 11 per resolution element. The broad emission line is expected to have a flux $F(\text{H}\alpha) \sim 1 \times 10^{-13}$ erg cm $^{-2}$ s $^{-1}$ and FWHM ~ 3000 -6000 km s $^{-1}$ (Bianchi et al 2012). Assuming a FWHM of 5000 km s $^{-1}$, we expect a S/N of 37 at the peak. We use the 52x01E1 aperture to mitigate CTE losses and two CR-SPLIT images at each slit position to eliminate cosmic rays. As for the SED measurements, we will utilize the STIS/NUV-MAMA with the F25SFR2 filter, centered at 2320 \AA to obtain imaging in the UV. Two dithered exposures will be obtained with a total exposure time of 300 sec, reaching a point source S/N of 17 for a flux of $F_{\lambda} \sim 1 \times 10^{-17}$ erg cm $^{-2}$ s $^{-1}$ \AA^{-1} . The acquisition image will instead provide a measurement of the AGN continuum at ~ 7000 \AA . Using the HST APT, our program can be completed within 4 HST orbits

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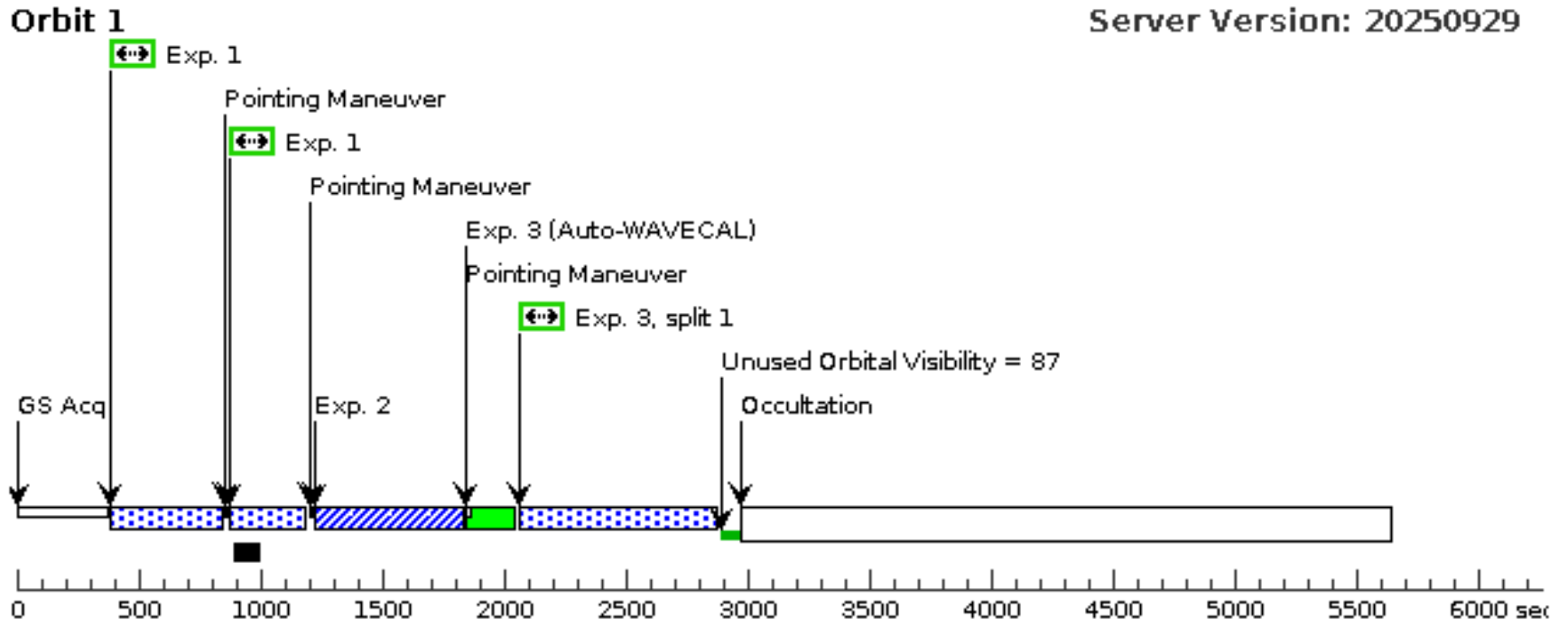
Thu Feb 05 15:00:14 GMT 2026

Visit	Proposal 18225, Visit 01 Diagnostic Status: Warning Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: (none)																
	(Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT (Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT																
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Patterns	<table border="1"> <thead> <tr> <th>#</th> <th>Primary Pattern</th> <th>Secondary Pattern</th> <th>Exposures</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td> Pattern Type=STIS-SPIRAL-DITH Coordinate Frame=POS-TARG Purpose=DITHER Pattern Orientation=26.6 Number Of Points=2 Angle Between Sides= Point Spacing=0.567 Center Pattern=false Line Spacing= </td> <td></td> <td>(1)</td> </tr> </tbody> </table>	#	Primary Pattern	Secondary Pattern	Exposures	(1)	Pattern Type=STIS-SPIRAL-DITH Coordinate Frame=POS-TARG Purpose=DITHER Pattern Orientation=26.6 Number Of Points=2 Angle Between Sides= Point Spacing=0.567 Center Pattern=false Line Spacing=		(1)								
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Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>NGC-3660</td> <td> RA: 11 23 32.2781 (170.8844921d) Dec: -08 39 30.73 (-8.65854d) Equinox: J2000 </td> <td> Proper Motion RA: 0.256 mas/yr Proper Motion Dec: -0.09899997621687362 mas/yr Parallax: 3.23E-4" Epoch of Position: 2000 </td> <td>V=14.45</td> <td>Reference Frame: ICRS</td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	NGC-3660	RA: 11 23 32.2781 (170.8844921d) Dec: -08 39 30.73 (-8.65854d) Equinox: J2000	Proper Motion RA: 0.256 mas/yr Proper Motion Dec: -0.09899997621687362 mas/yr Parallax: 3.23E-4" Epoch of Position: 2000	V=14.45	Reference Frame: ICRS	<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.</i></p> <p><i>Category=GALAXY</i> <i>Description=[NUCLEUS, SEYFERT]</i> <i>Extended=YES</i></p>			
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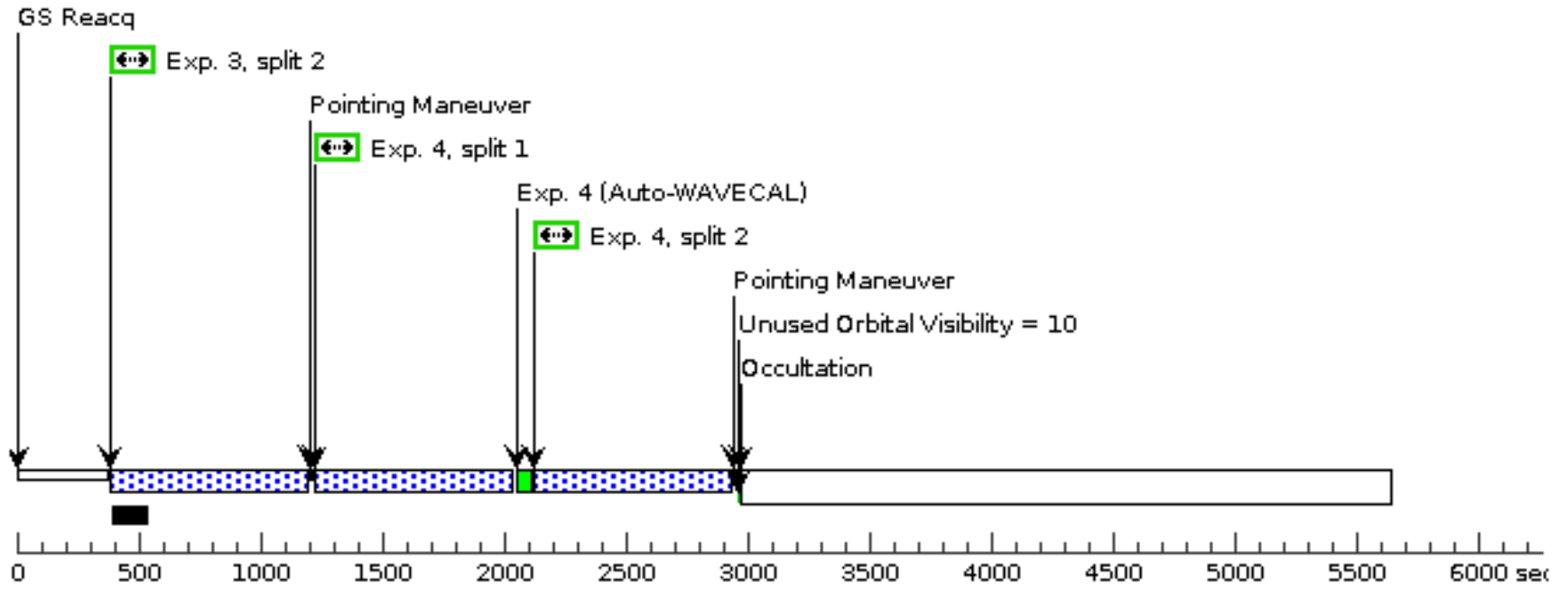
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Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	(STIS.im.22 70321)	(1) NGC-3660	STIS/NUV-MAMA, ACCUM, F25SRF2	MIRROR				Pattern 1, Exps 1-1 i n Visit 01 (1)	300 Secs (600 Secs)	
										[==>(Pattern 1)]	[1]
										[==>(Pattern 2)]	
	2		(1) NGC-3660	STIS/CCD, ACQ, F28X50LP	MIRROR					60 Secs (60 Secs)	
										[==>]	[1]
	3		(1) NGC-3660	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A					1550 Secs (1550 Secs)	
										[==>(Split 1)]	[1]
									[==>(Split 2)]	[2]	
4		(1) NGC-3660	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A			POS TARG 0.1,+0.0		1550 Secs (1550 Secs)		
									[==>(Split 1)]	[2]	
									[==>(Split 2)]		
5		(1) NGC-3660	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A			POS TARG 0.2,+0.0		1550 Secs (1550 Secs)		
									[==>(Split 1)]	[3]	
									[==>(Split 2)]		
6		(1) NGC-3660	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A			POS TARG -0.1,-0.0		1550 Secs (1550 Secs)		
									[==>(Split 1)]	[3]	
									[==>(Split 2)]	[4]	
7		(1) NGC-3660	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A			POS TARG -0.2,-0.0		1550 Secs (1550 Secs)		
									[==>(Split 1)]	[4]	
									[==>(Split 2)]		

Orbit Structure



Orbit 2



Orbit 3

GS Reacq

