



15225 - NGC 3147, a Golden true Type 2 AGN?

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

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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-3147 CCDFLAT	STIS/CCD	1	14-Jul-2017 12:04:43.0	yes

1 Total Orbits Used

ABSTRACT

The AGN unification scheme suggests that Type 2 AGN are identical to type 1 AGN, just observed from the side, where an inner torus structure obscures a direct view of the continuum and broad line region (BLR) emission. Is this unification scheme always true? In some low luminosity type 2 AGN we have a direct view of the innermost regions, as indicated by an unabsorbed and rapidly variable X-ray emission, yet no broad lines are observed. Are these true Type 2 AGN (i.e. the BLR is truly missing), or is the BLR emission just hard to detect in these weak AGN? Here we propose to address this question with the best true Type 2 AGN candidate, namely NGC 3147. If the narrow slit HST spectrum of the nucleus does not reveal the expected very broad and weak H alpha emission, then NGC 3147 can be declared as a Golden true type 2 AGN. It will show beyond any doubt that such objects do exist. If the BLR is detected, with the predicted extremely large line width, it will provide a stringent test of the mass scaling relations widely used and accepted by the community, opening up the possibility to measure directly the BH mass in nearby weakly active galaxies.

OBSERVING DESCRIPTION

We will observe the target for 1 orbit using STIS/CCD and the G750L grating. The observations are aimed at detecting a relatively bright but potentially very broad H emission line. In ground based spectra, the emission of such a line, if present, is heavily contaminated by the host galaxy stellar emission. We will use the 52x0.1 slit in order to reduce such a contamination by a factor of ~ 10 with respect to ground based observations. The use of the 0.1" slit has a great advantage with respect to wider slits because of the increased contrast with respect to both the stellar continuum and the narrow component of the emission line, which is mostly produced in the extended (kpc-scale) narrow line region.

The pointing will be aimed at the host galaxy photocenter as known from the literature.

A target acquisition image will be taken to allow recentering on the brightest region, where we expect a faint AGN to be visible. As recommended in the STIS handbook, we will use the F28X50LP filter for the acquisition image and an exposure time of 60s, which is appropriate for the expected surface brightness of ~ 15 mag arcsec⁻². We do not request a pickup, since the nucleus of the galaxy is diffuse. The STIS handbook states that the centering

accuracy is $\sim 0.1''$ for a diffuse target. In order to avoid missing the AGN at the center of the galaxy nucleus, we will obtain 5 spectra. The first will be centered at the location derived following the acquisition image. The following will be taken with a POS-TARG of $(+0.1, 0.0)$, $(+0.2, 0.0)$, $(-0.1, 0.0)$, $(-0.2, 0.0)$. This strategy is identical to previous successful programs aimed at studying faint AGN in low luminosity objects similar to our target, and/or to derive the stellar kinematics with the aim of measuring the BH mass in nearby galaxies (e.g. GO 7403, GO 8228). The short exposure times needed for these observations allow us to fit all five pointings and the acquisition image into one single orbit.

We performed accurate S/N simulations using the STIS ETC. The stellar continuum within the $0.1''$ slit is expected to be $F_{\text{lam}} \sim 2 \times 10^{-16} \text{ erg cm}^{-2} \text{ s}^{-1} \text{ \AA}^{-1}$, using the information derived from ground based spectra with a $1''$ slit centered onto the nucleus of the target.

The broad emission line is expected to have a flux $F(\text{H}\alpha) \sim 1 \times 10^{-13} \text{ erg cm}^{-2} \text{ s}^{-1}$. Based on its bolometric luminosity and BH mass, the width of the line is expected to be up to $40,000 \text{ km s}^{-1}$ (see Eq. 1). This extremely large width of the line prevents us from using a higher resolution grating, but note that ground-based observations already exclude narrower components with high confidence (Bianchi et al., 2008).

We use the 52x01E1 aperture to mitigate CTE losses, as suggested by the IHB, Sect 7.3.8.

We use two CR-SPLIT images at each slit position to eliminate cosmic rays in our relatively short exposures.

We also include simultaneous flat fields to perform de-fringing at long wavelengths, as recommended by the IHB in Sect. 7.2.6. These flats are taken during occultation, immediately after the last on-target exposure.

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Fri Jul 14 16:04:45 GMT 2017

Visit	Proposal 15225, Visit 01 Diagnostic Status: Warning Scientific Instruments: STIS/CCD Special Requirements: (none)				
	Diagnostics	(Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE			
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	NGC-3147	RA: 10 16 53.6509 (154.2235454d) Dec: +73 24 2.70 (73.40075d) Equinox: J2000		V=11.43
Miscellaneous: Reference Frame: ICRS <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> <i>The magnitude is the magnitude of the entire galaxy, not the nucleus. Expected nuclear fluxes are given in the Phase I proposal and in the description of the Observations</i>					

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Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) NGC-3147	STIS/CCD, ACQ, F28X50LP	MIRROR				60 Secs (60 Secs)	
									[==>]	[1]
	2		(1) NGC-3147	STIS/CCD, ACCUM, 52X0.1E1	G750L 7751 A				400 Secs (410 Secs)	
									[==>205.0 Secs (Split 1)]	[1]
									[==>205.0 Secs (Split 2)]	
	3		(1) NGC-3147	STIS/CCD, ACCUM, 52X0.1E1	G750L 7751 A		POS TARG 0.1,+0.0		400 Secs (410 Secs)	
									[==>205.0 Secs (Split 1)]	[1]
								[==>205.0 Secs (Split 2)]		
4		(1) NGC-3147	STIS/CCD, ACCUM, 52X0.1E1	G750L 7751 A		POS TARG 0.2,+0.0		400 Secs (410 Secs)		
								[==>205.0 Secs (Split 1)]	[1]	
								[==>205.0 Secs (Split 2)]		
5		(1) NGC-3147	STIS/CCD, ACCUM, 52X0.1E1	G750L 7751 A		POS TARG -0.1,-0.0		400 Secs (410 Secs)		
								[==>205.0 Secs (Split 1)]	[1]	
								[==>205.0 Secs (Split 2)]		
6		(1) NGC-3147	STIS/CCD, ACCUM, 52X0.1E1	G750L 7751 A		POS TARG -0.2,-0.0		400 Secs (410 Secs)		
								[==>205.0 Secs (Split 1)]	[1]	
								[==>205.0 Secs (Split 2)]		
7	FLATS	CCDFLAT	STIS/CCD, ACCUM, 52X0.1	G750L 7751 A				[==>(Copy 1)]	[1]	
								[==>(Copy 2)]		

