



11200 - An Ultraluminous EUV Source?

Cycle: 16, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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) NGC6946SNR	ACS/SBC	1	18-Jan-2008 02:46:41.0	yes

1 Total Orbits Used

ABSTRACT

Ultraluminous X-ray sources (ULXs) are bright, irregularly variable, non-nuclear, X-ray sources with apparent luminosities exceeding the Eddington limit for stellar-mass black holes. There is great interest in ULXs because they may represent a new class of black holes with masses intermediate between stellar-mass and supermassive black holes. Recently, it has been found that X-ray emission from the nebula MF 16 in the galaxy NGC 6946, previously thought to be an usually luminous supernova remnant, actually arises from an accreting compact object. Optical spectroscopy of nebula shows that it is powered via photoionization by an extreme ultraviolet (EUV) source with a luminosity exceeding that measured from the X-ray source. If correct this would be the first ultraluminous UV source and may be a 10,000 solar mass black hole. We propose an FUV observation with the ACS/SBC to determine if a highly luminous EUV source is indeed, present within MF 16.

OBSERVING DESCRIPTION

The goal of our observation is to determine if there is an EUV source powering the optical line emission observed from the very luminous nebula MF 16. We request one orbit of observations of the one target using the ACS Solar Blind Channel (SBC) with the F140LP filter.

ADDITIONAL COMMENTS

We ran the bright source avoidance tool and two objects were marked as possible problems. We also inspected the USNO B1 catalog and found one possible problem object. We obtained HST/WFPC2 images of the region taken on June 8, 2001, and examined these three sources. We do not believe that any of the three sources will violate the bright object limits.

Notes on possible problem sources:

1 - BOT star: Unknown, SBC, N1F8042543 at 20 35 2.3145, +60 11 57.63.

Closest star in USNOB1 (2.2 arcsec away) is 1501-0283183 at 20 35 02.3307 +60 11 59.790 which has R2mag = 18.56, Imag = 18.13, B1mag and B2mag not listed.

There is no source in the HST images at BOT position, but there is a source at the USNO B1 position. The WFPC2 images in the F555W filter gives $V = 20.2$, the F450W image gives $B = 22.8$. So, the $B-V$ color = $2.6 - 0.4 = 2.2$, which means this is a very red object. The V magnitude = 20.2 is within limits even for a O5V star.

2 - BOT star: Unknown, SBC, N1F8049349 at 20 35 2.4976, +60 11 44.46.

Closest star in USNOB1 (0.3 arcsec away) is 1501-0283184 at 20 35 02.5153 +60 11 44.760 which has B1mag = 19.14, R1mag = 17.49, B2mag = 18.91, R2mag = 17.15, Imag = 17.33.

HST images show source at BOT position with $V = 16.4$, $B = 18.2$. The $B-V$ color = $1.8 - 0.4 = 1.4$, which leads us to classify the star as M0V. The V magnitude of 16.4 is OK for spectral type B5V or later, so M0V is OK.

3 - Possible problem star in USNOB1, 1501-0283189 at 20 35 03.4700 +60 11 18.020 which has two B magnitude measurements: B1mag = 18.68, B2mag = 12.98. If the second B magnitude is correct, then star is sometimes rather bright. The star appears in the HST images with V = 18.1 and B = 19.7. So, $B-V = 1.6 - 0.4 = 1.2$, which leads us to classify it as K5V. V magnitude of 18.1 is OK for spectral type B1V or later, so K5V is OK. With this spectral classification, even the B magnitude of 12.98 would be OK.

For color corrections, used the measured $A_V = 1.141$ for NGC 6946

Proposal 11200 - Visit 01 - An Ultraluminous EUV Source?

Fri Jan 18 07:46:45 GMT 2008

Visit	Proposal 11200, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/SBC Special Requirements: (none)										
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
(1)		NGC6946SNR	RA: 20 35 0.7500 (308.7531250d) Dec: +60 11 30.90 (60.19192d) Equinox: J2000		V=18.6	Reference Frame: ICRS					
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1		(1) NGC6946SNR	ACS/SBC, ACCUM, SBC	F140LP				934.0 Secs X 2 [=>1380.0 Secs (Copy 1)] [=>1380.0 Secs (Copy 2)]	[1]	
Orbit Structure	<p>Orbit 1 Server Version: 20071214</p> <p>Timeline labels: GS Acq, Exp. 1, copy 1, Exp. 1, copy 2, Occultation, Unused Visibility = 7</p> <p>X-axis: 0, 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 5500 sec</p>										
	<p>Diagram description: The orbit structure shows a sequence of events over time. At 0 seconds, 'GS Acq' occurs. At approximately 300 seconds, 'Exp. 1, copy 1' begins. At approximately 1800 seconds, 'Exp. 1, copy 2' begins. At approximately 3200 seconds, 'Occultation' occurs. A blue checkered bar highlights the period from approximately 300 seconds to 3200 seconds. A small black square at the occultation time indicates a 7-second 'Unused Visibility' period.</p>										