



14780 - Measurement of the Expansion Proper Motions of the Ou4 Giant Bipolar Outflow to Determine its Distance and its True Nature

Cycle: 24, 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) OU4-SOUTH-LOBE	WFC3/UVIS	2	29-Jul-2016 15:38:52.0	yes

2 Total Orbits Used

ABSTRACT

Ou4 is a giant bipolar outflow with a total length of 1.2 degrees on the sky that was discovered in the optical in the direction of the blister HII region Sh2-129. The distance, the nature, and the driving source of Ou4 are, however, not known. Ou4 is relevant for the study of the eruptive phenomena producing collimated outflows from evolved low-mass binary stars and young, massive stellar systems. Our morpho-kinematics study of the Ou4 south bow-shock has allowed us to predict its expansion proper motion that is directly related to its distance. We propose to image the brightest [O III] emission of this bow-shock with the UVIS channel of the WFC3 in Cycle 24 and 26 in order to determine the distance of this largest known stellar bipolar outflow from its expansion proper motions. This measurement is crucial to determine the true nature of Ou4: either a foreground

planetary nebula or a giant bipolar outflow launched ~90,000 years ago by HR 8119, the young massive triple system ionising Sh2-129.

OBSERVING DESCRIPTION

We use the WFC3/UVIS channel with the F502N narrow filter to survey the brightest emission of the 5007 Å line of the [O III] doublet in the Ou4 giant bipolar outflow.

We execute dithered exposures using the B6 pattern (pre-defined WFC3-UVIS-MOS-DITH-LINE pattern has been modified), which combines two steps over the chip gap to maximize the surveyed area and sub-pixel steps to improve the PSF sampling (WFC3 ISR 2010-09). The six frames are executed inside the same orbit for the best dither pointing accuracy. We use parallel buffer dumps.

We add a flash at the end of each exposure (12 electrons) to reduce the charge losses during the detector readouts.

Proposal 14780 - first epoch imaging (01) - Measurement of the Expansion Proper Motions of the Ou4 Giant Bipolar Outflow to Deter...

Fri Jul 29 19:38:53 GMT 2016

Visit	Proposal 14780, first epoch imaging (01) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 92D TO 110 D <i>Comments: Two consecutive orbits. We require a specific orientation to maximize the survey of this bow shock and to exclude a V=10.7-mag star from the detector in order to prevent any filter and window ghost artifacts (the latter being produced in a such narrow filter image by star with V<12 mag in quadrant D; WFC3 ISR 2011-16) that would disturb our proper motion measurement. We use an angle tolerance of 9 degrees to increase the schedulability (22 Oct.-9 Nov. 2016 and 11 Nov.-18 Nov. 2016).</i>									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
(1)		Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.632 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=47.134 Angle Between Sides= Center Pattern=true	Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.119 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=33.715 Angle Between Sides= Center Pattern=false	(1), (2)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	OU4-SOUTH-LOBE	RA: 21 13 21.2367 (318.3384862d) Dec: +59 24 39.15 (59.41087d) Equinox: J2000		V=(?) 2.25E-16	Reference Frame: ICRS				
<i>Comments: The target is extended and has a very small expansion proper motion. The pointing coordinates are optimized to maximize the emission survey. The flux is our surface brightness threshold in erg/s/cm2/arcsec2. Extended=YES</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) OU4-SOUTH-L OBE	WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=12			Pattern 1, Exps 1-1 in first epoch imaging (01) (1)	1000 Secs (2440 Secs) [==>408.0 Secs (Pattern 1,1)] [==>406.0 Secs (Pattern 1,2)] [==>407.0 Secs (Pattern 2,1)] [==>406.0 Secs (Pattern 2,2)] [==>407.0 Secs (Pattern 3,1)] [==>406.0 Secs (Pattern 3,2)]	[1]
<i>Comments: We add a flash at the end of each exposure (12 electrons) to reduce the charge losses during the detector readouts.</i>										
2	(1) OU4-SOUTH-L OBE	WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=12			Pattern 1, Exps 2-2 in first epoch imaging (01) (1)	1000 Secs (2551 Secs) [==>425.0 Secs (Pattern 1,1)] [==>425.0 Secs (Pattern 1,2)] [==>425.0 Secs (Pattern 2,1)] [==>425.0 Secs (Pattern 2,2)] [==>425.0 Secs (Pattern 3,1)] [==>426.0 Secs (Pattern 3,2)]	[2]	
<i>Comments: We add a flash at the end of each exposure (12 electrons) to reduce the charge losses during the detector readouts.</i>										



