11558 - Planetary Nebulae, Globular Clusters and Binary Mergers

Cycle: 17, 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) IRAS18333-2357	ACS/WFC	2	30-Jun-2009 22:38:45.0	yes
02	(1) PN-JAFU-1	ACS/WFC	1	30-Jun-2009 22:38:49.0	yes

3 Total Orbits Used

ABSTRACT

Four planetary nebulae (PNe) have been found within 130 of the 150 globular clusters (GCs) of our Galaxy. This might not seem like many, but stellar evolution predicts that the old populations of these clusters should contain no PN at all! Observations of three of the four GC PNe show them to have peculiar characteristics, possibly indicative of a binary/merger origin. In particular two of the three observed GC PNe have masses which correspond to main sequence masses ~2-3 times the clusters' turn-off masses, sugesting mergers of two, or even three stars have taken place. One of the three observed PNe is H-deficient, a characteristic exhibited by only 5 out of hundreds of field PNe. H-deficient PNe have been associated with

binarity. As usual, not all parameters for these three PNe are clean indications of their binary origin. In an approved cycle 15 ACS/WFI proposal we asked to obtain observations of the only GC PN that has never been observed before at high resolution and whose central star has never been detected, as well as of the one H-deficient GC PN for which only low-quality WFPC2 images exist. When ACS stopped working we moved part of the observations to WFPC2. With this proposal we ask to complete our project, by obtaining two ACS/WFI images that could not be efficiently taken with WFPC2. These objects could tip the balance toward a binary interpretation for the GC PNe or make us seriously reconsider our understanding of stellar evolution in old populations.

OBSERVING DESCRIPTION

We will aquire ACS/WFI observations in the [OIII] filter (F502N) of the PNs JaFu1 and IRAS18333-2357. For JaFu1 (one orbit, one visit) we will use a 3-point dither pattern (796s x 3). For IRAS18333 we will use 2 orbits and a 4-point dither pattern, where 2 pointings will be taken in each orbit (441s x 2, 2322s, 2102s). We will center our objects on the WFC1 to insure that we do not end up in the gap between the two chips.

ADDITIONAL COMMENTS

A few changes were made to Phase II compared to what was proposed in Phase I. These have all been pre-approved. They are: a switch from HRC to WFI for the entire program.

Visit

Proposal 11558, Visit 01

Wed Jul 01 02:38:51 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=3.0 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1)

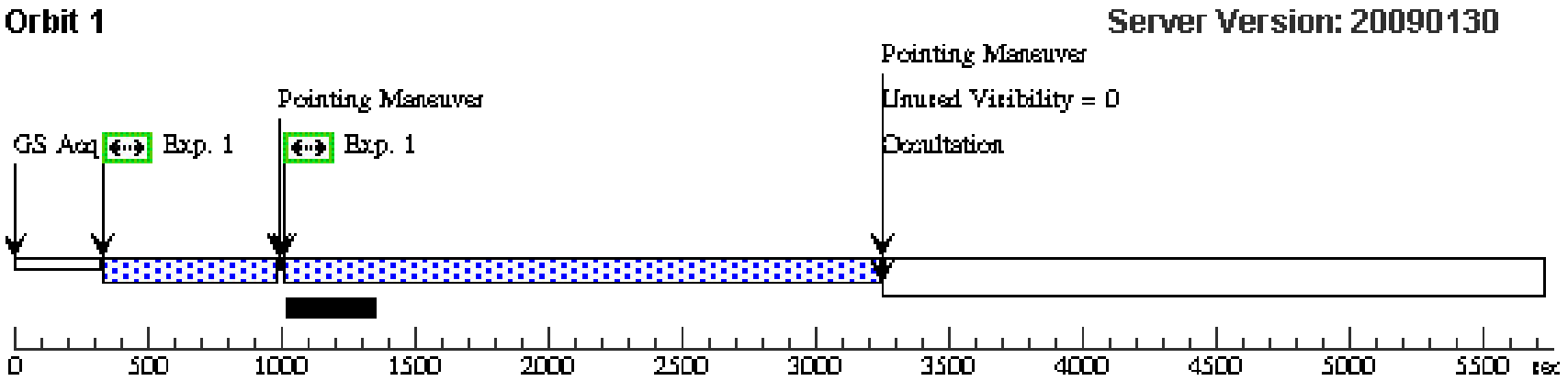
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	IRAS18333-2357	RA: 18 36 22.8800 (279.0953333d) Dec: -23 55 22.46 (-23.92291d) Equinox: J2000		V=14.3+/-0.1 [OIII]=2.8e-15 erg/s/cm2/asec2 (observed)	Reference Frame: WFPC2 IMAGE

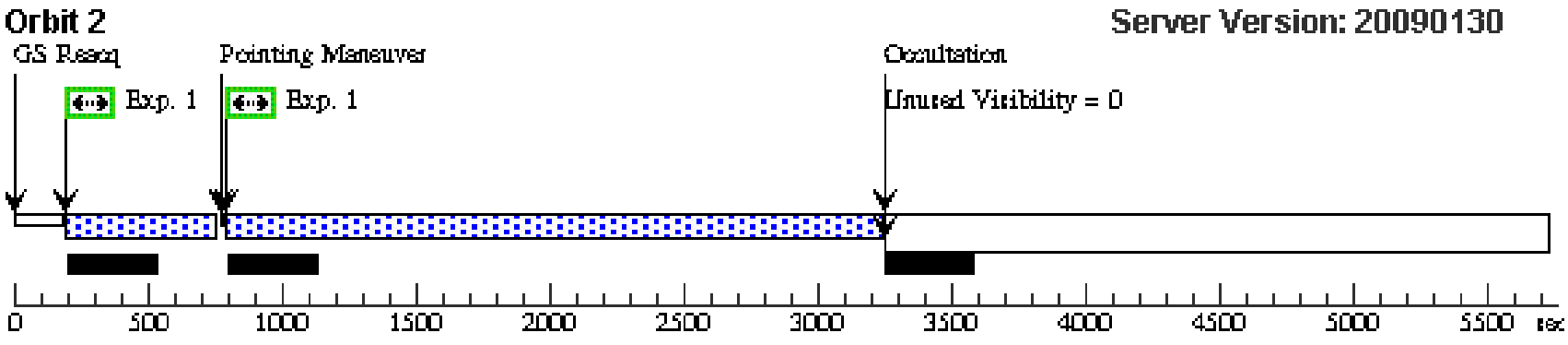
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	IRAS18333-[OIII]	(2) IRAS18333-2357	ACS/WFC, ACCUM, WFC1	F502N	CR-SPLIT=NO		Pattern 2, Exps 1-1 (2)	4860 Secs	
								[==>441.0 Secs (Pattern 1)] *[==>2102.0 Secs (Pattern 2)]*	***[1]***
								[==>441.0 Secs (Pattern 3)] *[==>2322.0 Secs (Pattern 4)]*	***[2]***

Orbit Structure



Orbit Structure (continued)



Visit

Proposal 11558, Visit 02, implementation Wed Jul 01 02:38:52 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.0 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PN-JAFU-1	RA: 17 43 57.2100 (265.9883750d) Dec: -26 11 53.45 (-26.19818d) Equinox: J2000		V=(?) [OIII]=5.8e-15 erg/s/cm2/asec2 (observed)	Reference Frame: WFPC2 IMAGE

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

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	JaFu1-[OIII]	(1) PN-JAFU-1	ACS/WFC, ACCUM, WFC1	F502N			Pattern 1, Exps 1-1 (1)	1000 Secs *[==>796.0 Secs (Pattern 1)]* *[==>796.0 Secs (Pattern 2)]* *[==>796.0 Secs (Pattern 3)]*	***[1]***

Orbit Structure