



11308 - Planetary Nebulae, Globular Clusters, and Binary Mergers

Cycle: 16, Proposal Category: GO/DD

(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) JAFU1	WFPC2	1	18-Jan-2008 05:43:22.0	yes

1 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, suggesting 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 this proposal we ask to obtain WFPC2/WFC

observations of the only GC PN that has never been observed before at high resolution and whose central star has never been detected. This 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. HST is essential for the task since this PN is tiny and the clusters it lives in is crowded.

Our request to use DD time for this proposal was encouraged by the Telescope Time Review Board after they denied an instrument change request for our cancelled ACS/WFC program. The denial resulted from a substantial change in observing strategy which was deemed too complex not to be reviewed by a TAC.

OBSERVING DESCRIPTION

We will observe the central star of the planetary nebula JaFu 1 in the globular cluster Pal 6 using the WFPC2.

For photometry of the central star, we will obtain 2x160 sec dithered exposures in F555W and F814W. To minimize CTE effects, we are placing the star at the WFALL position in WF3. The single orbit will be filled out with 2x500 sec in F656N, in order to obtain a narrow-band image of the surrounding planetary nebula in the light of H-alpha. The PN is small enough (about 6"x8") that the entire nebula will fall within WF3 when the central star is placed at the WFALL position.

Proposal 11308 - Visit 01 - Planetary Nebulae, Globular Clusters, and Binary Mergers

Fri Jan 18 10:43:26 GMT 2008

Visit	Proposal 11308, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	JAFU1 Alt Name1: PAL6-PN	RA: 17 43 57.3800 (265.9890833d) Dec: -26 11 54.00 (-26.19833d) Equinox: J2000		V=21.5+/-1 [OIII]=5.8e-15; Ha=2.4e-14 (cg s/sq.arcsec; observed)	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	JaFu1-F555 W	(1) JAFU1	WFPC2, IMAGE, WFALL-FIX	F555W	ATD-GAIN=7; CR-SPLIT=NO			160.0 Secs [==>]	[1]
	2	JaFu1-F814 W	(1) JAFU1	WFPC2, IMAGE, WFALL-FIX	F814W	ATD-GAIN=7; CR-SPLIT=NO			160.0 Secs [==>]	[1]
	3	JaFu1-F656 N	(1) JAFU1	WFPC2, IMAGE, WFALL-FIX	F656N	ATD-GAIN=7; CR-SPLIT=NO			500.0 Secs [==>]	[1]
	4	JaFu1-F555 W	(1) JAFU1	WFPC2, IMAGE, WFALL-FIX	F555W	ATD-GAIN=7; CR-SPLIT=NO	POS TARG -0.2489 4999999999998,-0.2 489499999999998		160.0 Secs [==>]	[1]
	5	JaFu1-F814 W	(1) JAFU1	WFPC2, IMAGE, WFALL-FIX	F814W	ATD-GAIN=7; CR-SPLIT=NO	POS TARG -0.2489 4999999999998,-0.2 489499999999998		160.0 Secs [==>]	[1]
	6	JaFu1-F656 N	(1) JAFU1	WFPC2, IMAGE, WFALL-FIX	F656N	ATD-GAIN=7; CR-SPLIT=NO	POS TARG -0.2489 4999999999998,-0.2 489499999999998		500.0 Secs [==>]	[1]

