10853 - M82 as a Fossil Starburst: Probing the Super Star Cluster Content of Region B

Cycle: 15, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets*	*Configurations*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) MESSIER-082-B-2	ACS/HRC	3	11-May-2006 21:00:50.0	yes
02	(1) MESSIER-082-B-1	ACS/HRC	3	11-May-2006 21:00:56.0	yes

6 Total Orbits Used

ABSTRACT

The importance of M82 as a benchmark for starburst studies has been recognised by the STScI-sponsored ACS/WFC mosaic of M82 in the B, V, I and H alpha filters. This proposal supplements this unique legacy dataset by obtaining U-band observations (F330W filter) of the fossil starburst region B in M82. This region is rich in compact intermediate age (~ 1 Gyr) star clusters. The combination of U-band photometry with the ACS/WFC STScI BVI survey and archival NICMOS JH data will allow us to derive accurate ages, luminosities and masses for this rare population of intermediate age massive star clusters. The U-band is essential for determining ages of clusters < 2 Gyr old because it measures the depth of the Balmer jump. We will use these data to determine the true shape of the cluster luminosity function (CLF) for the M82-B fossil starburst region and thus address the question of whether young massive clusters will eventually become globular clusters.

OBSERVING DESCRIPTION

We have chosen the ACS/HRC camera in preference to WFPC2 because the proposed dataset will complement the few U-band observations of M82 (A, C, F) that exist which have all been obtained with ACS/HRC. The HRC also has the advantage that the light profiles of the clusters in M82 will be much better defined than the PC because of the smaller pixel size. At the distance of M82, 1 HRC pixel approximately equals 0.5 pc compared to a typical cluster diameter of 6 pc.

To calculate exposure times, we are guided by the study of M82-B by de Grijs et al. (2001, AJ, 121, 768) which reached a 50% completeness limit at V of 22.5 mag. This translates to a mass of 50,000 solar masses for a 1 Gyr old cluster which is a factor of two deeper than the mass corresponding to the peak of the globular cluster mass function at 10^5 solar masses. In fact, we expect to go deeper than this because the STScI BVI mosaic of M82 will reach fainter V magnitudes than those of de Grijs et al. (2001). The extinction in region B is variable; from previous studies, we adopt an upper limit of E(B-V)=1.0. This will ensure that we go deep enough at U to match the new, deeper ACS BVI data. With the F330W filter and an A7V spectral type (appropriate for a cluster with an age of ~ 1 Gyr), a S/N of 10 is reached in 130 min for V=22.5. To cover region B with HRC, we will use two separate pointings; M82-B1 and M82-B2. We therefore require a total exposure time of 260 min. The exposures will be broken down into sub-exposures and will be acquired using the ACS dither-line pattern to remove hot pixels.

REAL TIME JUSTIFICATION

None

CALIBRATION JUSTIFICATION

None

ADDITIONAL COMMENTS

None

Visit

Proposal 10853, Visit 01 Fri May 12 01:00:58 GMT 2006

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/HRC

Special Requirements: (none)

Comments: None

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-HRC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=0.198 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=44.3 Angle Between Sides= Center Pattern=false		(1)

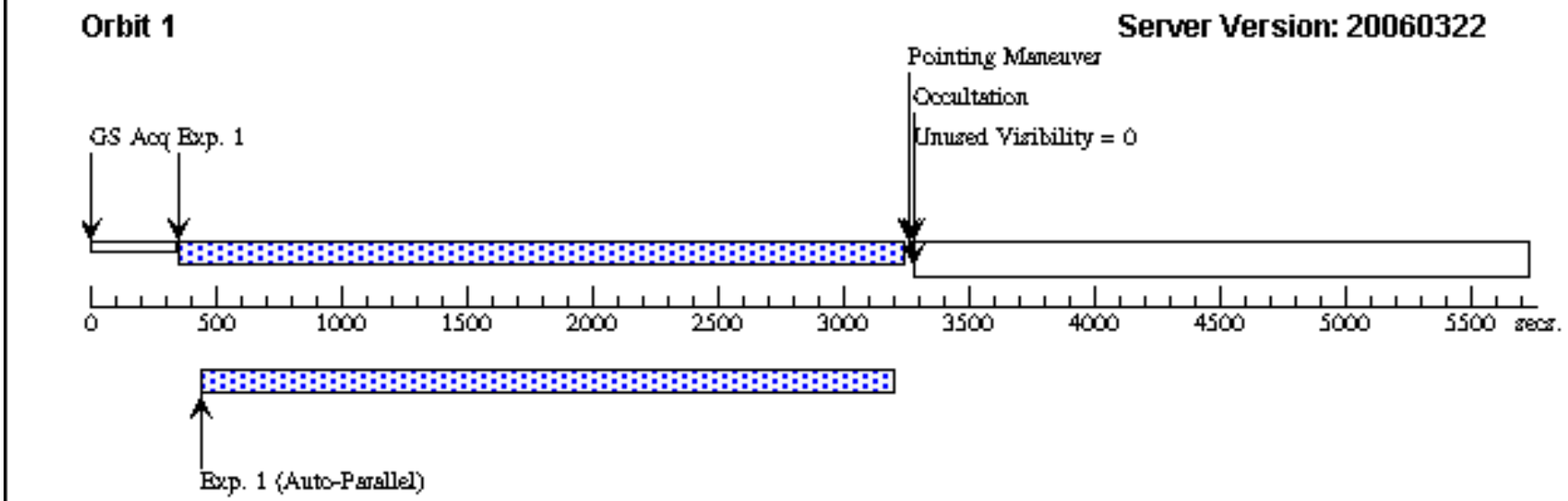
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	MESSIER-082-B-2	RA: 09 55 56.3123 (148.9846346d) Dec: +69 41 2.06 (69.68391d) Equinox: J2000		V=19.0	Reference Frame: HST Image

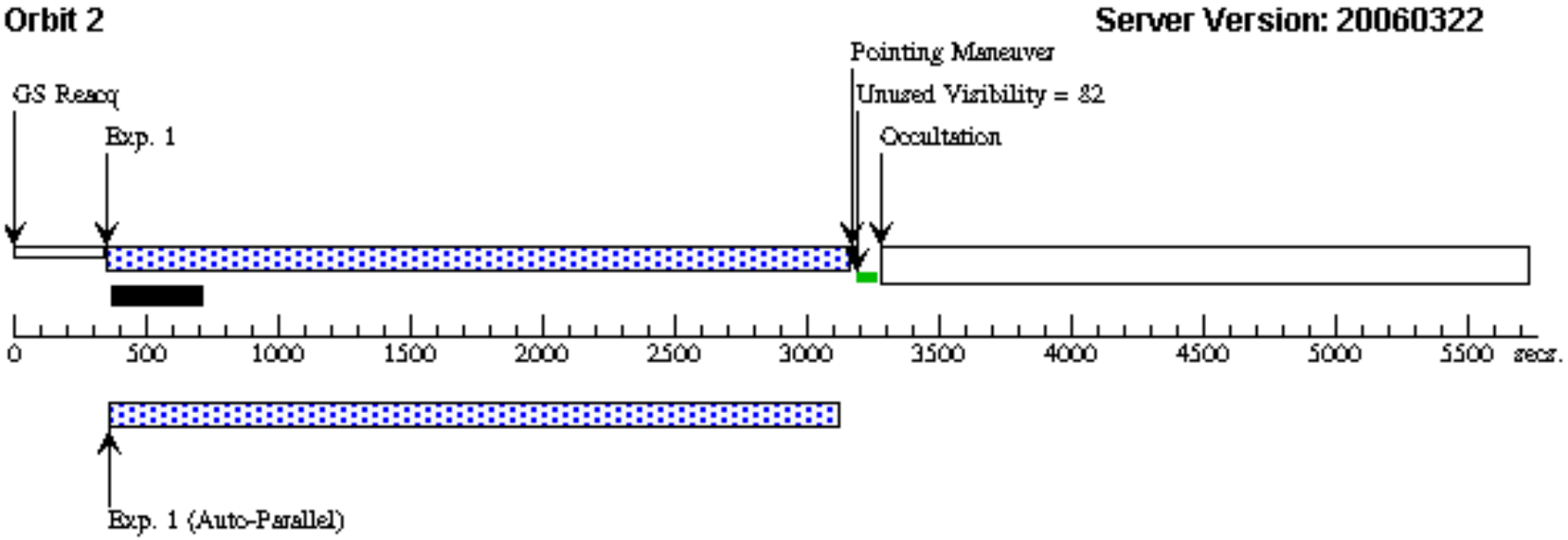
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) MESSIER-082-B-2	ACS/HRC, ACCUM, HRC	F330W	CR-SPLIT=NO; GAIN=2		Pattern 1-1 (1)	2777.0 Secs	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)]	***[3]***

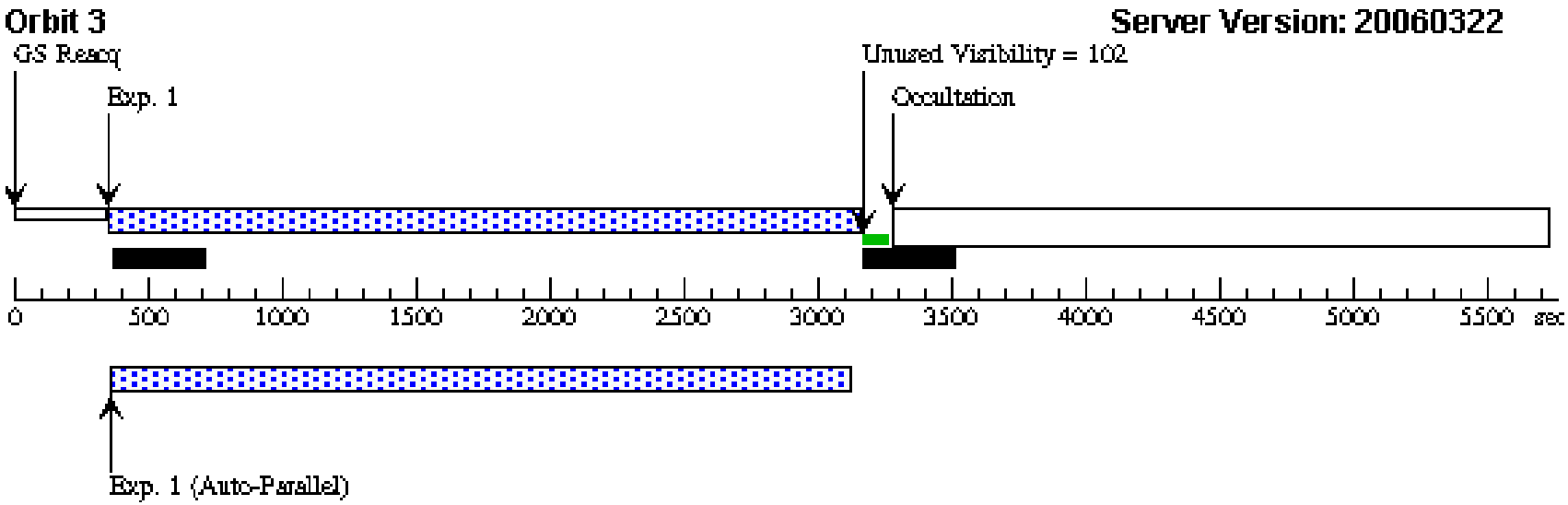
Orbit Structure



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 10853, Visit 02 Fri May 12 01:00:59 GMT 2006

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/HRC

Special Requirements: SAME ORIENT AS 01

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-HRC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=0.198 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=44.3 Angle Between Sides= Center Pattern=false		(1)

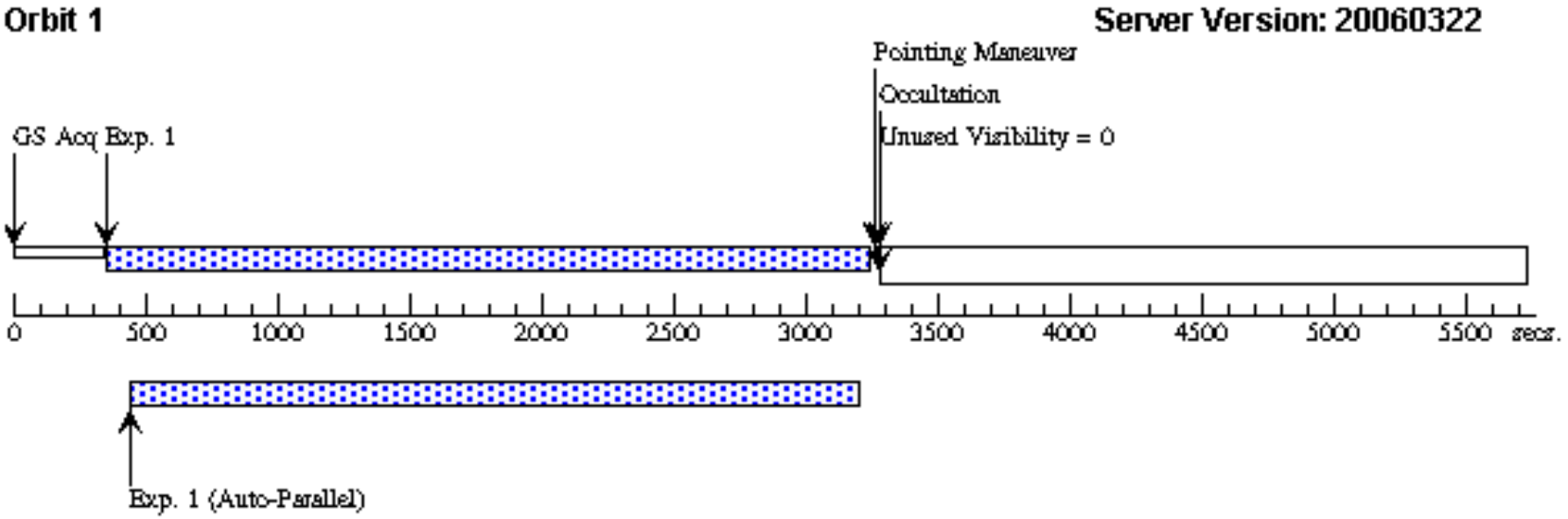
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MESSIER-082-B-1	RA: 09 56 1.6033 (149.0066804d) Dec: +69 41 9.92 (69.68609d) Equinox: J2000		V=19.0	Reference Frame: HST Image

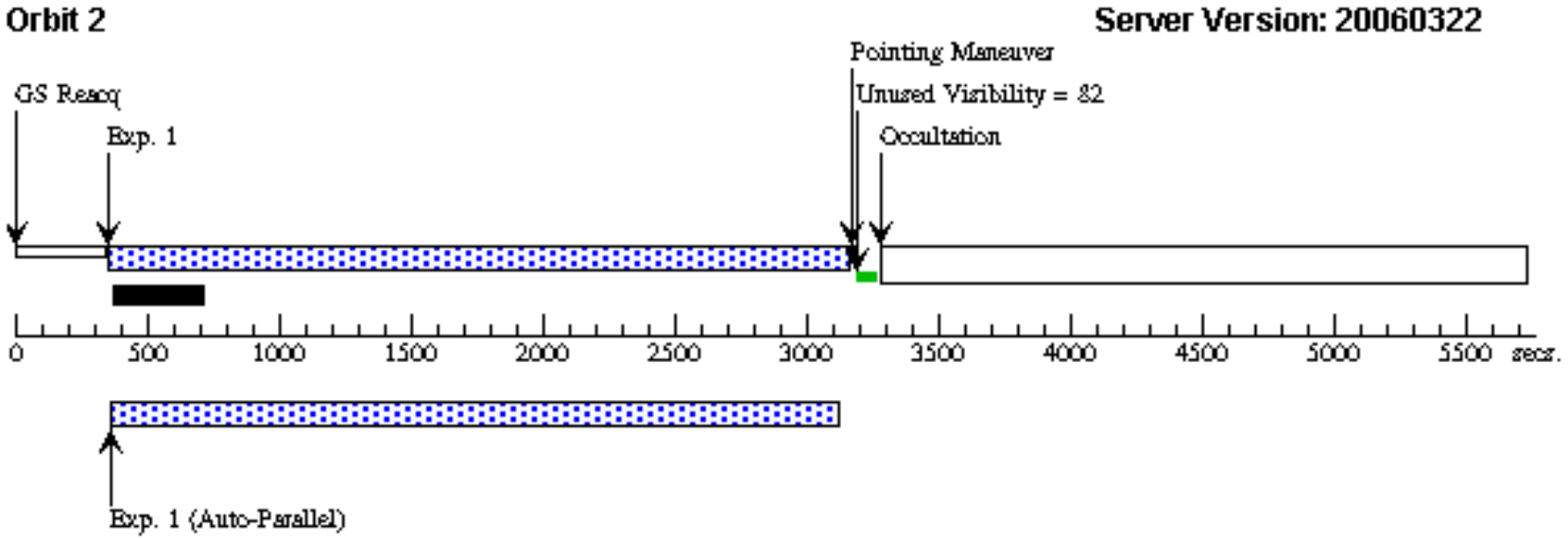
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) MESSIER-082-B-1	ACS/HRC, ACCUM, HRC	F330W	CR-SPLIT=NO; GAIN=2		Pattern 1-1 (1)	2777.0 Secs	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)]	***[3]***

Orbit Structure



Orbit Structure (continued)



Orbit Structure (continued)