12997 - The Blue Horizontal Branch as a Reliable Tracer of Galaxy Stellar Halos

Cycle: 20, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Benjamin F. Williams (PI) (Contact)	**University of Washington**	**ben@astro.washington.edu**
Dr. Julianne Dalcanton (CoI)	University of Washington	jd@astro.washington.edu
Prof. Puragra Guhathakurta (CoI)	University of California - Santa Cruz	raja@ucolick.org
Dr. Karoline Gilbert (CoI)	University of Washington	kgilbert@astro.washington.edu
Dr. Tod R. Lauer (CoI)	National Optical Astronomy Observatory, AURA	lauer@noao.edu
Dr. Anil C. Seth (CoI)	University of Utah	aseth@astro.utah.edu
Dr. Jason S. Kalirai (CoI)	Space Telescope Science Institute	jkalirai@stsci.edu
Dr. Dustin Lang (CoI)	Carnegie Mellon University	dstn@astro.princeton.edu
Dr. Leo Girardi (CoI) (ESA Member)	Osservatorio Astronomico di Padova	leo.girardi@oapd.inaf.it

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) M31-MINOR-AXIS-30 (2) M31-MINOR-AXIS-36	ACS/WFC WFC3/UVIS	2	11-Jul-2012 00:44:22.0	yes

2 Total Orbits Used

ABSTRACT

We propose ACS and WFC3 F475W and F814W imaging in two fields between 5 and 10 kpc along the minor axis of M31. These locations sample the transition between the bulge/disk-dominated and halo-dominated regions. The images would cover a total of 19 square arcminutes and would be used to characterize the complete blue horizontal branch (BHB) populations within the halo/bulge transition zone. The observations will test model

predictions of the density of BHB stars and the ratio of BHB to red giant branch stars at these radii. Our present halo model is based on HST measurements of BHB stars from 2 to 35 kpc, but has a large gap in coverage from 5 kpc to 10 kpc. The proposed observations will result in the first reliable M31 halo profile covering such a large radial baseline, breaking degeneracies in current attempts to decompose M31 into bulge, disk, and halo components. Furthermore, this test will validate the use of the BHB to measure halo profiles in other systems, potentially making it possible to characterize galaxy halo populations with photometry that reaches only the horizontal branch. Our proposed observations will bridge the current gap between the large amounts of HST data available in the M31 halo and the excellent HST coverage of the M31 disk. Ultimately, these data will complete the most reliable profile ever measured of the inner regions of the M31 stellar halo, which yields an accurate total stellar halo mass and represents an historical record of how the halo formed.

OBSERVING DESCRIPTION

We are performing ACS/WFC and WFC3/UVIS observations in parallel, orienting the telescope so that the fields are aligned with the M31 minor axis. Both cameras will observe for one orbit through the F475W filter and one orbit through the F814W filter.

Visit

Proposal 12997, m31-minor-axis (01) Wed Jul 11 04:44:33 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SCHED 100%; ORIENT 79D TO 79 D

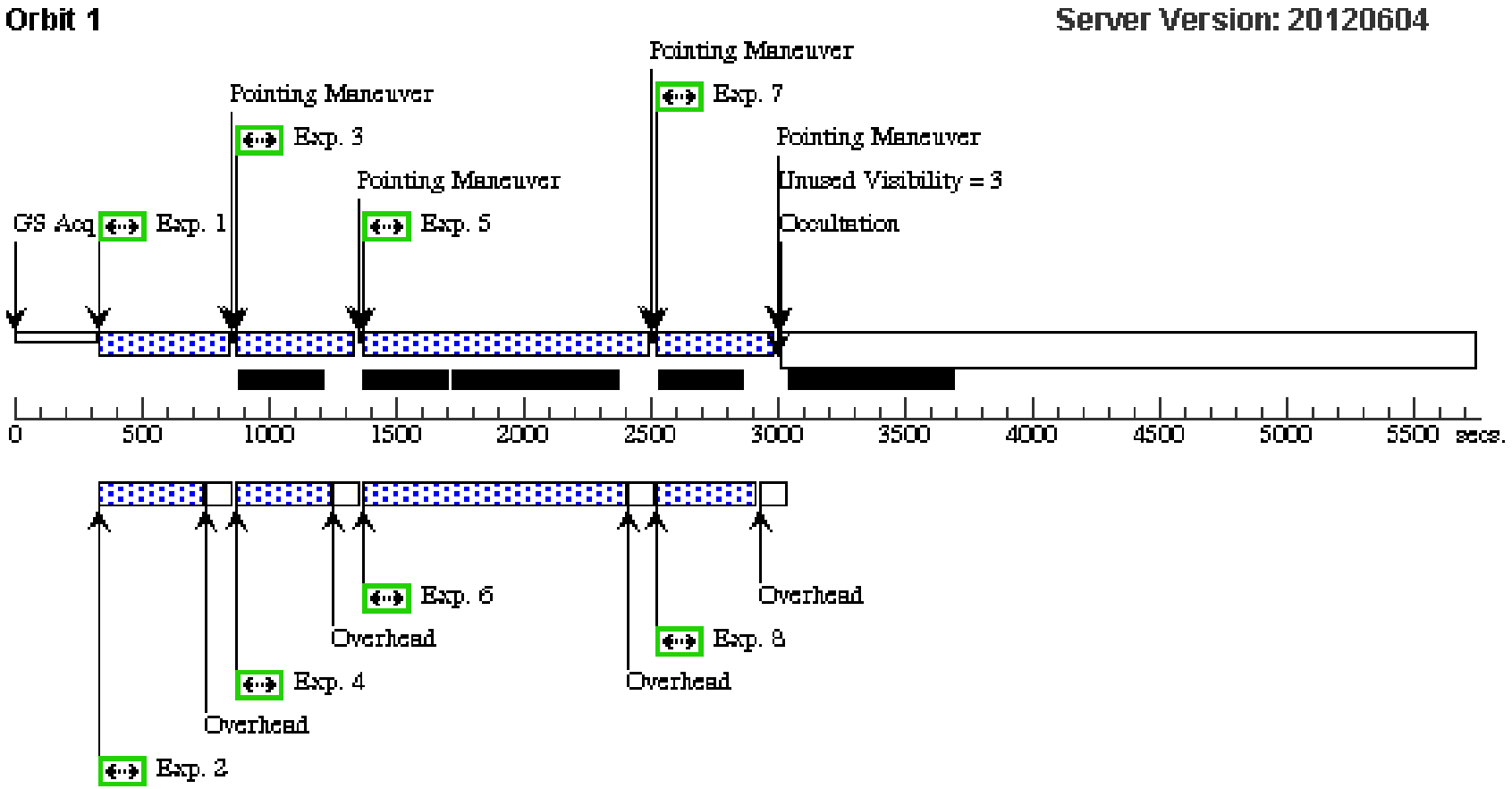
Fixed Targets

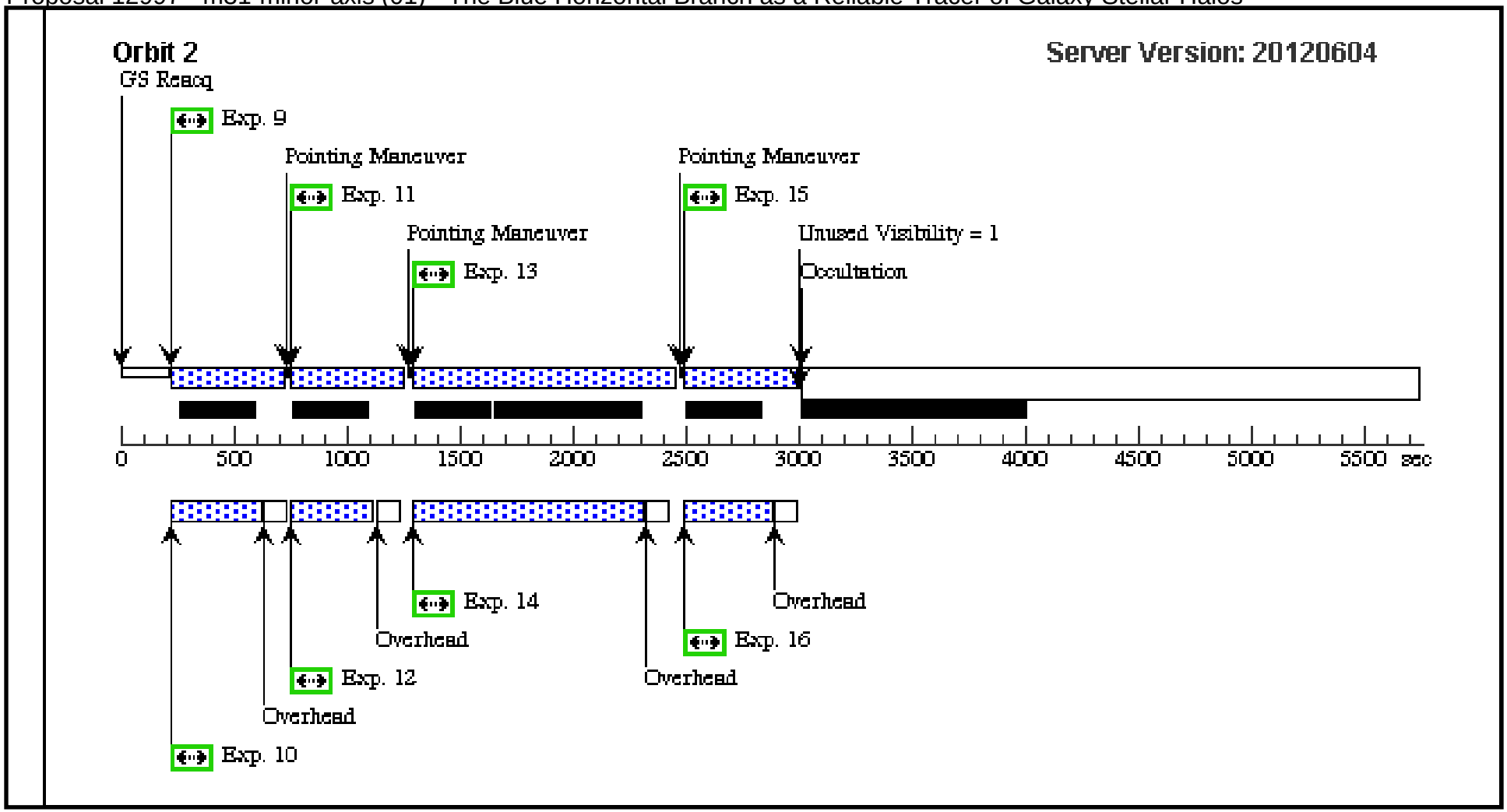
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	M31-MINOR-AXIS-30	RA: 00 44 46.6541 (11.1943921d) Dec: +40 56 50.08 (40.94724d) Equinox: J2000		V=26.5	Reference Frame: ICRS
(2)	M31-MINOR-AXIS-36	RA: 00 44 46.6541 (11.1943921d) Dec: +40 56 50.08 (40.94724d) Equinox: J2000		V=26.5	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	ACS F475W 1	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F475W			Prime + Parallel Group 1-2 in m31-minor-axis (01)	300 Secs *[==>]*	***[1]***
2	WFC3 F475W 1	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F475W			Prime + Parallel Group 1-2 in m31-minor-axis (01)	370 Secs *[==>380.0 Secs]*	***[1]***
3	ACS F475W 2	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F475W		POS TARG 0.125,null	Prime + Parallel Group 3-4 in m31-minor-axis (01)	340 Secs *[==>]*	***[1]***
4	WFC3 F475W 2	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F475W			Prime + Parallel Group 3-4 in m31-minor-axis (01)	360 Secs *[==>370.0 Secs]*	***[1]***
5	ACS F475W 3	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F475W		POS TARG 0.125,-0.125	Prime + Parallel Group 5-6 in m31-minor-axis (01)	1000 Secs *[==>]*	***[1]***
6	WFC3 F475W 3	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F475W			Prime + Parallel Group 5-6 in m31-minor-axis (01)	1020 Secs *[==>1030.0 Secs]*	***[1]***
7	ACS F475W 4	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F475W		POS TARG 0.0 ,-0.125	Prime + Parallel Group 7-8 in m31-minor-axis (01)	340 Secs *[==>]*	***[1]***
8	WFC3 F475W 4	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F475W			Prime + Parallel Group 7-8 in m31-minor-axis (01)	390 Secs *[==>390.0 Secs]*	***[1]***
9	ACS F814W 1	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F814W			Prime + Parallel Group 9-10 in m31-minor-axis (01)	300 Secs *[==>339.0 Secs]*	***[2]***
10	WFC3 F814W 1	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group 9-10 in m31-minor-axis (01)	370 Secs *[==>380.0 Secs]*	***[2]***
11	ACS F814W 2	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.125,null	Prime + Parallel Group 11-12 in m31-minor-axis (01)	340 Secs *[==>379.0 Secs]*	***[2]***
12	WFC3 F814W 2	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group 11-12 in m31-minor-axis (01)	360 Secs *[==>360.0 Secs]*	***[2]***
13	ACS F814W 3	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.125,-0.125	Prime + Parallel Group 13-14 in m31-minor-axis (01)	1000 Secs *[==>1039.0 Secs]*	***[2]***
14	WFC3 F814W 3	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group 13-14 in m31-minor-axis (01)	1020 Secs *[==>1020.0 Secs]*	***[2]***
15	ACS F814W 4	(1) M31-MINOR-AXIS-30	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.0 ,-0.125	Prime + Parallel Group 15-16 in m31-minor-axis (01)	340 Secs *[==>379.0 Secs]*	***[2]***
16	WFC3 F814W 4	(2) M31-MINOR-AXIS-36	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group 15-16 in m31-minor-axis (01)	390 Secs *[==>390.0 Secs]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20120604
GS Reacq
Exp. 9
Pointing Maneuver
Exp. 11
Pointing Maneuver
Exp. 13
Pointing Maneuver
Exp. 15
Unused Visibility = 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 14
Overhead
Overhead
Exp. 16
Exp. 12
Overhead
Overhead
Exp. 10