



10544 - Resolved Images of LMC Microlensing Events Observed by a Telescope at 2 AU from Earth

Cycle: 14, Proposal Category: GO
(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. David P. Bennett (PI)	University of Notre Dame	
Dr. Michael F. A'Hearn (CoI)	University of Maryland	
Dr. Andy Becker (CoI)	University of Washington	
Dr. Ian Bond (CoI)	Massey University	
Dr. Kem Cook (CoI)	Lawrence Livermore National Laboratory	
Dr. Andrew Gould (CoI)	The Ohio State University Research Foundation	
Prof. Yasushi Muraki (CoI)	Nagoya University	
Dr. Andrzej Udalski (CoI)	Warsaw University	
Dr. Philip Yock (CoI)	The University of Auckland	

VISITS

<i>Visit</i>	<i>Targets</i>	<i>Configurations</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) OGLE-2005-SMC-1	NIC2	1	31-May-2006 21:01:02.0	yes
02	(1) OGLE-2005-SMC-1	WFPC2	1	31-May-2006 21:01:10.0	yes
03	(1) OGLE-2005-SMC-1	ACS/HRC	1	31-May-2006 21:01:14.0	yes
04	(1) OGLE-2005-SMC-1	NIC2	1	31-May-2006 21:01:28.0	yes

Proposal 10544 - Overview

<i>Visit</i>	<i>Targets</i>	<i>Configurations</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
05	(1) OGLE-2005-SMC-1	ACS/HRC	1	31-May-2006 21:01:34.0	yes
14	(1) OGLE-2005-SMC-1	NIC2	1	31-May-2006 21:01:43.0	yes

6 Total Orbits Used

ABSTRACT

The identity of the lens objects for most of the LMC microlensing events seen by the MACHO Project is unknown. The most popular explanations include a previously unknown population of old, cool white dwarfs in the Galactic halo or in a very thick disk, or a variation standard LMC models that would allow most events to be caused by faint LMC stars. This uncertainty exists because it is usually impossible to determine the lens distance from the observable features of a microlensing event. Distance estimates can be obtained by measuring the microlensing parallax effect with simultaneous observations of the events from Earth and from a small (~30cm) telescope located 1-2 AU from the Earth. Such a telescope has just been launched: the High Resolution Instrument on the flyby spacecraft of the Deep Impact (DI) Mission. This telescope has been placed in an ideal orbit for LMC microlensing parallax measurements, and the telescope will be at a distance of >1 AU from Earth when the DI prime mission ends this August. Our group plans to take advantage of this fortuitous circumstance and propose a "new science" extended mission for the DI flyby spacecraft to resolve the LMC microlensing puzzle with microlensing parallax observations. This project is compatible with the DI Science Teams extended mission plans to visit a 2nd comet, and our extended mission proposal to NASA will be written in collaboration with the Deep Impact Science team. A crucial feature of these proposed microlensing parallax measurements is the determination of the absolute brightness of the source stars, which can only be resolved with HST images. The source star brightness must be measured over the entire sensitivity range of the Deep Impact High Resolution Instrument clear filter: 300-1000nm. We therefore request UBV_r HST images to resolve the blending of the microlensed LMC source stars observed by the Deep Impact 30cm telescope.

OBSERVING DESCRIPTION

We are requesting 2 single orbit visits of 2 LMC microlensing events to be provided by the SuperMACHO, OGLE-III, and MOA-II microlensing surveys. The first visit for each target will be scheduled while the target star is magnified by microlensing, and the second orbit will be scheduled after the event is over. The scheduling of the first visit for each target will be more

Proposal 10544 - Overview

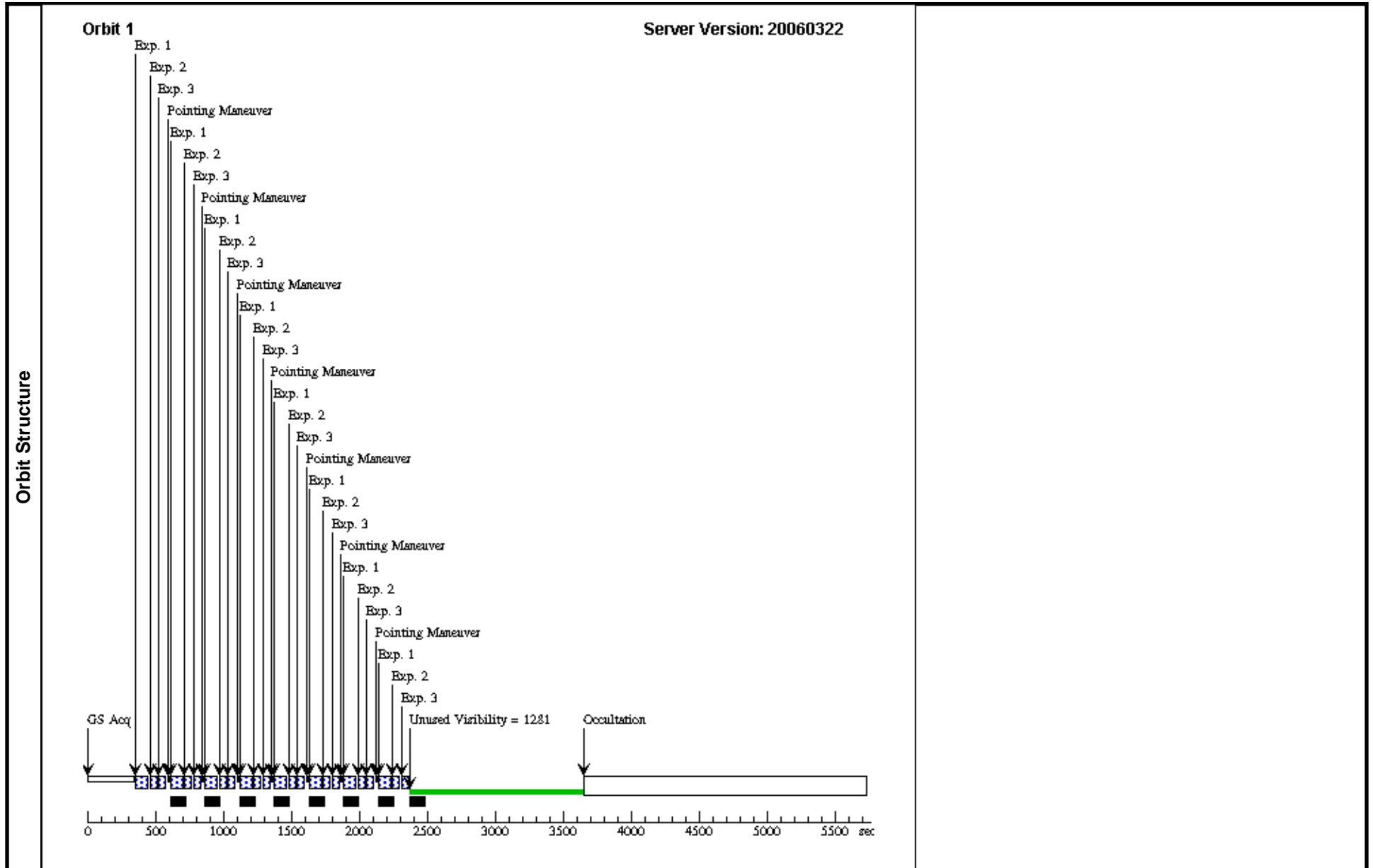
time critical, and so we have assumed that the first visit is scheduled at a time with only 55 minutes of target visibility, while the second visit can be scheduled at a time with a much greater target visibility period of 80 minutes or more. (Such extended visibility periods are common for our LMC targets, even in 2-gyro mode.) The exposure times for the first visit to each target may be shortened when the microlensing events occur if that will make prompt observations easier to schedule. Since our main scientific goal is a comparison with observations from the DI/HRI through a clear filter, our exposure times will be selected to approximately match the throughput expected in the DI/HRI clear filter images. The first visit for each target will consist of ACS/HRC exposures totaling 360 seconds in each of the F435W, F555W, F625W, and F775W passbands with 4 CR split images per exposure and dithering to deal with hot pixels. It is important to have multi-color observations when the source star is still magnified by the microlens in order to test the possibility that the source may still be blended in the HST frames. (This was the case with microlensing event MOA-2002-BLG-33, which was imaged with HST while the microlensing event was still in progress.) An apparent color change of the source star between the two visits would be evidence of a blended source.

We expect to observe 2 LMC microlensing events in the first year of the DI extended mission with at an average unmagnified magnitude of $V = 21$. These same exposures will be repeated in the second visit for each target, and exposures totaling 465 sec in each of the F330W and F850LP passbands will also be added in this longer visit.

Proposal 10544 - Visit 01 - Resolved Images of LMC Microlensing Events Observed by a Telescope at 2 AU from Earth

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	OGLE-2005-SMC-1	RA: 00 40 28.1500 (10.1172917d) Dec: -73 44 46.10 (-73.74614d) Equinox: J2000			V=19.6+/-0.1 I= 18.6

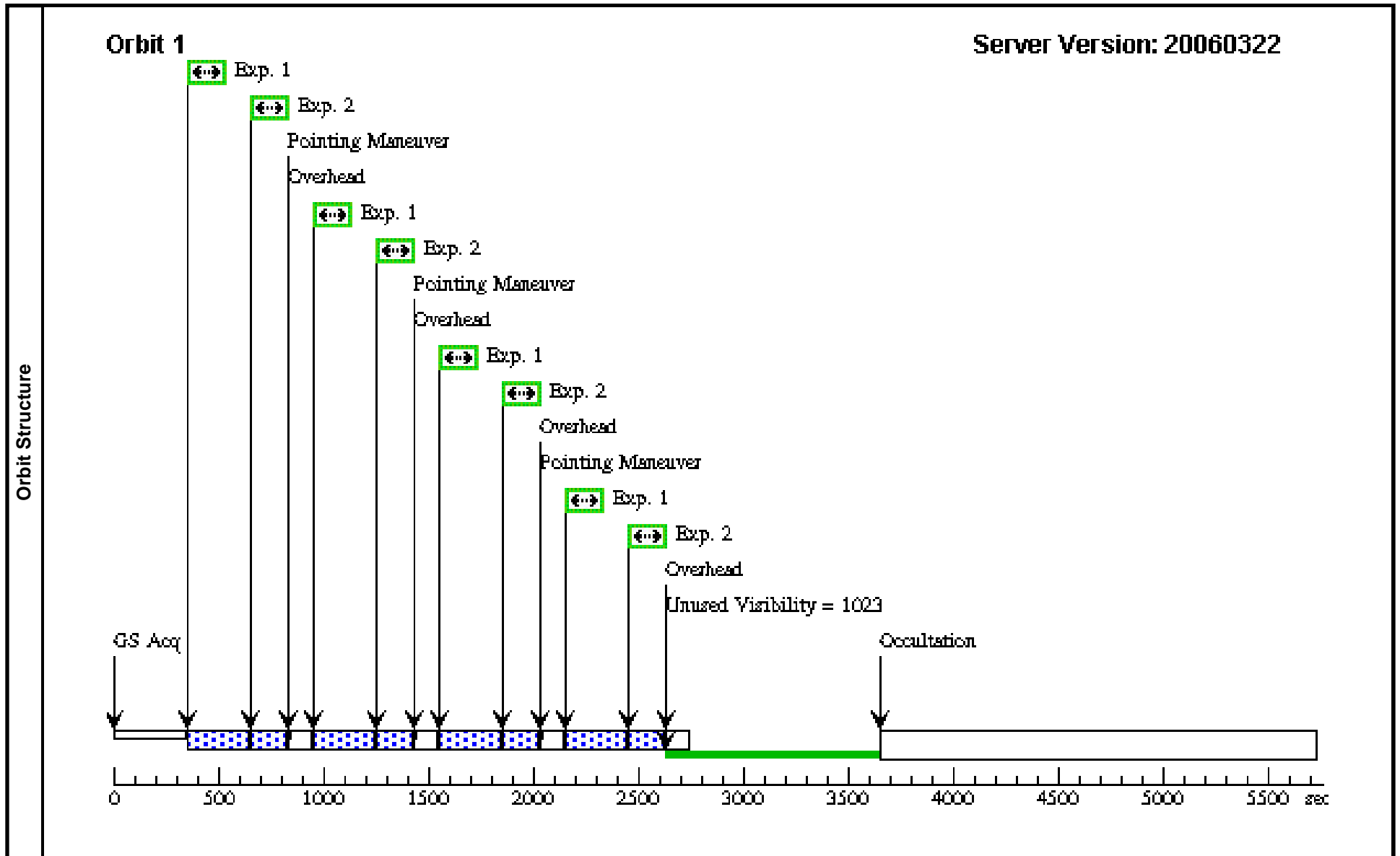
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F205W	SAMP-SEQ=STEP8 ; NSAMP=15		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]
	2		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP2 ; NSAMP=25		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]
	3		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F110W	SAMP-SEQ=STEP2 ; NSAMP=25		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]



Proposal 10544 - Visit 02 - Resolved Images of LMC Microlensing Events Observed by a Telescope at 2 AU from Earth

Thu Jun 01 01:01:48 GMT 2006

Visit	Proposal 10544, Visit 02 Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: (none)										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
(3)		Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559 Line Spacing=0.559	Coordinate Frame=POS-TARG Pattern Orientation=26.6 Angle Between Sides=143.1 Center Pattern=false						(1-2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections	Fluxes		Miscellaneous			
	(1)	OGLE-2005-SMC-1	RA: 00 40 28.1500 (10.1172917d) Dec: -73 44 46.10 (-73.74614d) Equinox: J2000			V=19.6+/-0.1 I= 18.6		Coordinate Source: MICROLENSING SURVEY			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(1) OGLE-2005-SM C-1	WFPC2, IMAGE, PC1	F814W			Pattern 1-2 (3)	100.0 Secs		
									[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]		[1]
	2		(1) OGLE-2005-SM C-1	WFPC2, IMAGE, PC1	F555W			Pattern 1-2 (3)	100.0 Secs		
								[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]		[1]	



Proposal 10544 - Visit 03 - Resolved Images of LMC Microlensing Events Observed by a Telescope at 2 AU from Earth

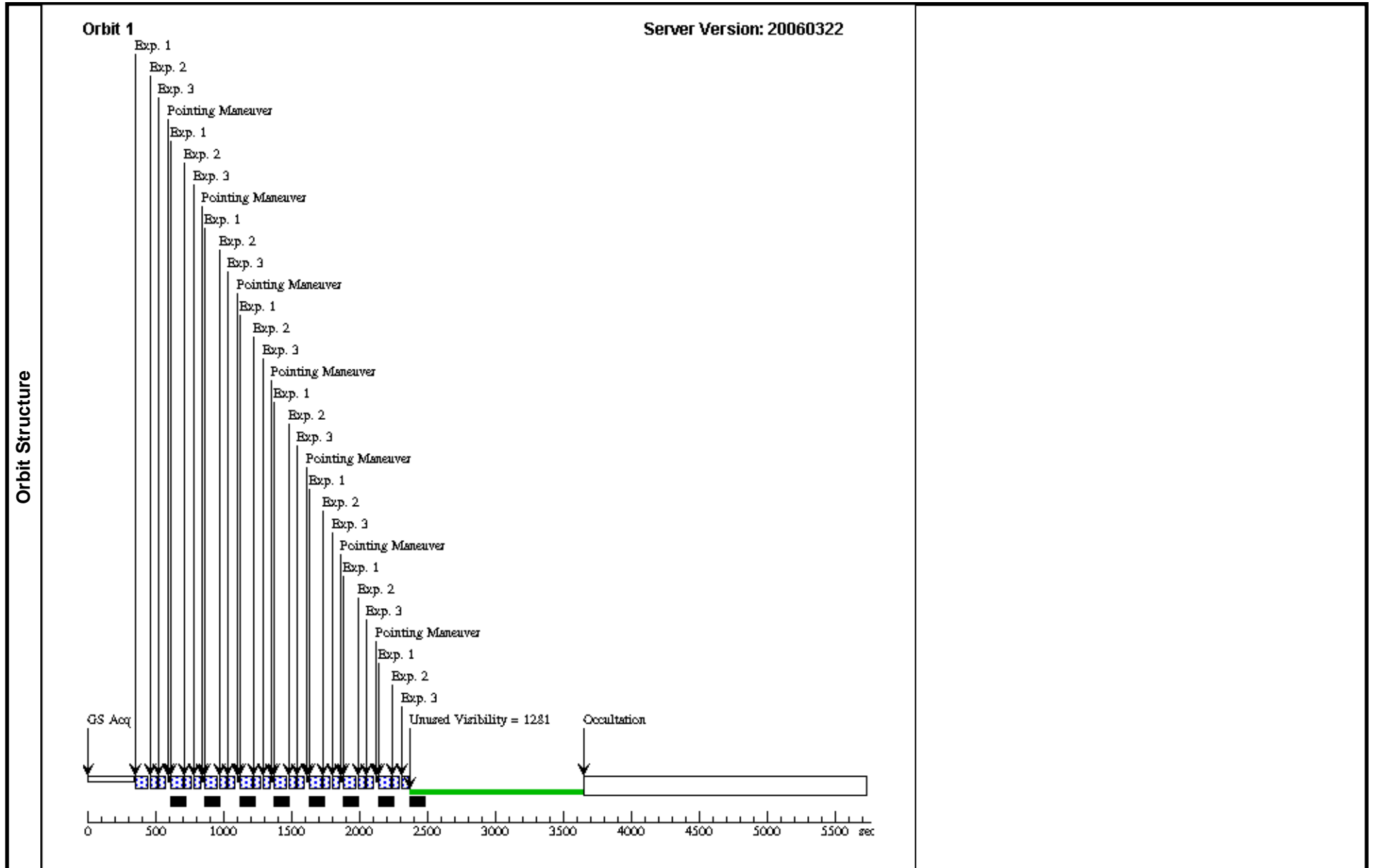
Thu Jun 01 01:01:49 GMT 2006

Visit	Proposal 10544, Visit 03 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/HRC Special Requirements: BETWEEN 26-SEP-2005:00:00:00 AND 17-OCT-2005:00:00:00; ON HOLD <i>On Hold Comments: Select either visit 02 or visit 03 based on guide star availability.</i>									
	Patterns	#	Primary Pattern				Secondary Pattern			
(2)		Pattern Type=LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.077 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=31.1 Angle Between Sides= Center Pattern=false					(1-2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(1)	OGLE-2005-SMC-1	RA: 00 40 28.1500 (10.1172917d) Dec: -73 44 46.10 (-73.74614d) Equinox: J2000				V=19.6+/-0.1 I= 18.6		Coordinate Source: MICROLENSING SURVEY	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) OGLE-2005-SM C-1	ACS/HRC, ACCUM, HRC	F814W	CR-SPLIT=NO		Pattern 1-2 (2)	50.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(1) OGLE-2005-SM C-1	ACS/HRC, ACCUM, HRC	F555W	CR-SPLIT=NO		Pattern 1-2 (2)	75.0 Secs	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	

Proposal 10544 - Visit 04 - Resolved Images of LMC Microlensing Events Observed by a Telescope at 2 AU from Earth

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	OGLE-2005-SMC-1	RA: 00 40 28.1500 (10.1172917d) Dec: -73 44 46.10 (-73.74614d) Equinox: J2000			V=19.6+/-0.1 I= 18.6

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F205W	SAMP-SEQ=STEP8 ; NSAMP=15		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]
	2		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP2 ; NSAMP=25		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]
	3		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F110W	SAMP-SEQ=STEP2 ; NSAMP=25		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]



Proposal 10544 - Visit 05 - Resolved Images of LMC Microlensing Events Observed by a Telescope at 2 AU from Earth

Thu Jun 01 01:01:51 GMT 2006

Visit	Proposal 10544, Visit 05 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/HRC Special Requirements: (none)									
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures
(2)		Pattern Type=LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.077 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=31.1 Angle Between Sides= Center Pattern=false						(1-2)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	OGLE-2005-SMC-1	RA: 00 40 28.1500 (10.1172917d) Dec: -73 44 46.10 (-73.74614d) Equinox: J2000			V=19.6+/-0.1 I= 18.6	Coordinate Source: MICROLENSING SURVEY			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) OGLE-2005-SM C-1	ACS/HRC, ACCUM, HRC	F814W	CR-SPLIT=NO		Pattern 1-2 (2)	50.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(1) OGLE-2005-SM C-1	ACS/HRC, ACCUM, HRC	F555W	CR-SPLIT=NO		Pattern 1-2 (2)	75.0 Secs	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	

Proposal 10544 - Visit 14 - Resolved Images of LMC Microlensing Events Observed by a Telescope at 2 AU from Earth

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	OGLE-2005-SMC-1	RA: 00 40 28.1500 (10.1172917d) Dec: -73 44 46.10 (-73.74614d) Equinox: J2000			V=19.6+/-0.1 I= 18.6

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F205W	SAMP-SEQ=STEP8 ; NSAMP=15		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]
	2		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP2 ; NSAMP=25		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]
	3		(1) OGLE-2005-SM C-1	NIC2, MULTIACCUM, NIC2	F110W	SAMP-SEQ=STEP2 ; NSAMP=25		Pattern 1-3 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)] [==>(Pattern 6)] [==>(Pattern 7)] [==>(Pattern 8)]	[1]

