



11297 - Reducing Systematic Errors on the Hubble Constant: Metallicity Calibration of the Cepheid PL Relation

Cycle: 16, Proposal Category: GO

(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>
62	(3) M101-F3	WFPC2	1	18-Jan-2008 05:33:50.0	yes
63	(2) M101-F2	WFPC2	1	18-Jan-2008 05:33:54.0	yes
64	(1) M101-F1	WFPC2	1	18-Jan-2008 05:33:56.0	yes

3 Total Orbits Used

ABSTRACT

Reducing the systematic errors on the Hubble constant is still of significance and of immediate importance to modern cosmology. One of the largest remaining uncertainties in the Cepheid-based distance scale (which itself is at the foundation of the HST Key Project determination of H_0) which can now be addressed directly by HST, is the effect of metallicity on the Cepheid Period-Luminosity relation. Three chemically distinct regions in M101 will be used to directly measure and thereby calibrate the change in zero point of the Cepheid PL relation over a range of metallicities that run from SMC-like, through Solar, to metallicities as high as the most metal-enriched galaxies in the pure Hubble flow. ACS for the first time offers the

opportunity to make a precise calibration of this effect which currently accounts for at least a third of the total systematic uncertainty on H_0 . The calibration will be made in the V and I bandpasses so as to be immediately and directly applicable to the entire HST Cepheid-based distance scale sample, and most especially to the highest-metallicity galaxies that were hosts to the Type Ia supernovae, which were then used to extend the the distance scale calibration out to cosmologically significant distances.

OBSERVING DESCRIPTION

Three fields in M101 will be monitored in the V and I bandpasses searching for Cepheids. A window of 45 days will be optimally sampled by 12 observations. A single orbit containing both the V and the I exposures will reach the required signal-to-noise ratio for the shortest-period (3-5 day) Cepheids

Visit	Proposal 11297, Visit 62, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 245.0D TO 245.0 D										
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous					
	(3)	M101-F3	RA: 14 02 28.0000 (210.6166667d) Dec: +54 18 20.00 (54.30556d) Equinox: J2000 Comments: These coordinates have been changed from 14 02 29.0, +54 18 20, to acquire guide star coverage.		V=23+/-2	Reference Frame: ICRS					
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1	(3) M101-F3	WFPC2, IMAGE, WFALL	F814W		GS ACQ SCENARI O SINGLE			350.0 Secs [==>]	[1]	
	Comments: there are no time constraints on this visit										
	2	(3) M101-F3	WFPC2, IMAGE, WFALL	F814W						350.0 Secs [==>]	[1]
	3	(3) M101-F3	WFPC2, IMAGE, WFALL	F555W						500.0 Secs [==>]	[1]
4	(3) M101-F3	WFPC2, IMAGE, WFALL	F555W						500.0 Secs [==>]	[1]	
Orbit Structure	Server Version: 20071214 										

Proposal 11297 - Visit 63 - Reducing Systematic Errors on the Hubble Constant: Metallicity Calibration of the Cepheid...

Fri Jan 18 10:34:00 GMT 2008

Visit	Proposal 11297, Visit 63, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
(2)		M101-F2	RA: 14 02 51.0000 (210.7125000d) Dec: +54 20 22.00 (54.33944d) Equinox: J2000 <i>Comments: changed to IRCS coordinate frame since GSC2 is not recognized.</i>		V=23+/-2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(2) M101-F2	(2) M101-F2	WFPC2, IMAGE, WFALL	F814W				350.0 Secs [==>]	[1]
	2	(2) M101-F2	(2) M101-F2	WFPC2, IMAGE, WFALL	F814W				350.0 Secs [==>]	[1]
	3	(2) M101-F2	(2) M101-F2	WFPC2, IMAGE, WFALL	F555W				500.0 Secs [==>]	[1]
	4	(2) M101-F2	(2) M101-F2	WFPC2, IMAGE, WFALL	F555W				500.0 Secs [==>]	[1]
Orbit Structure	<div style="display: flex; justify-content: space-between;"> <div> <p>Orbit 1</p> </div> <div> <p>Server Version: 20071214</p> </div> </div>									

Proposal 11297 - Visit 64 - Reducing Systematic Errors on the Hubble Constant: Metallicity Calibration of the Cepheid...

Fri Jan 18 10:34:01 GMT 2008

Visit	Proposal 11297, Visit 64, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
(1)		M101-F1	RA: 14 03 28.8000 (210.8700000d) Dec: +54 21 35.00 (54.35972d) Equinox: J2000		V=23+/-2	Reference Frame: ICRS				
Comments: This object was generated by the targetselector and retrieved from the NED database. changed to ICRS coordinate frame since GSC2 is not recognized.										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) M101-F1	WFPC2, IMAGE, WFALL	F814W				350.0 Secs	
									[==>]	[1]
	2		(1) M101-F1	WFPC2, IMAGE, WFALL	F814W				350.0 Secs	
									[==>]	[1]
								500.0 Secs		
								[==>]	[1]	
								500.0 Secs		
								[==>]	[1]	

Orbit 1

Server Version: 20071214

