10565 - The outermost globular cluster of M31

Cycle: 14, 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	(1) BO514	ACS/WFC	2	18-Jul-2005 22:10:31.0	yes

2 Total Orbits Used

ABSTRACT

We have recently identified a previously unknown globular cluster in the M31 system that is located at 4 degrees from the center of the galaxy and in proximity (14 arcmin apart) of the major axis. This is by far the most remote M31 cluster presently known, more than 1 degree farther than any other recognized cluster.

Low resolution spectra have confirmed that the object is member of M31 and its line-of-sight velocity lie approximately on the extrapolation of the HI rotation curve of the galaxy.

The projected position and kynematics of the cluster strongly suggest that it may be associated with the disc of M31. If this hypothesis will be confirmed it would imply that the stellar disc of M31 extends out to ~55 kpc (the projected galactocentric distance of the newly discovered object) with far reaching consequences on our ideas of the formation of galactic discs. We propose ACS/WFC observations aimed at obtaining the Color Magnitude Diagram of the cluster and its surroundig field to constrain the age and metallicity of both populations. This will provide direct indications on the actual extension and epoch of formation of the M31 disc as well as a deep insight in the stellar content of a remote region of this galaxy that has not been studied before.

OBSERVING DESCRIPTION

We plan to take a 2412s exposure in F606W and a 2418 s exposure in F814W (one visit, two orbits, 2gyroscopes). Both exposures should be acquired with 3 pionts line dither to allow an effective cleaning from cosmic rays and hot pixels.
In the first orbit we will take the F606W exposures, since this filter is more sensitive than the F814W one for the F Mains Sequence stars we are interested in, in the proximity of our detection threshold.
According to the ACS/WFC ETC, assuming gain=2 e-/ADU and a target star of F0V spectral type, with the above exposure times we well reach S/N> 13 in F606W and S/N> 7 in F814W for a V=27.0 star, in the combined images. In the same configuration, S/N> 3 will be achieved for stars of V=28.0 in both filters. All the above ETC estimates of the S/N as a function of magnitude has been performed on 2 x 2 pixel^2 apertures. Note that this is a conservative choice since for stellar photometry the key parameter for the detection of stars in a frame is the S/N ratio in the central pixel, for which the ETC typically predicts larger S/N ratios (by a factor ~1.5). Hence the objectives described in the scientific justification can be safely achieved with this observational strategy. A long experience with the photometry of M31 globular clusters using the PC camera of the WFPC2 (whose resolution is very similar to that of the ACS/WFC) shows that useful photometry of large radial annuli can be successfully achieved even for the most concentrated clusters (see, f.i., Fusi Pecci et al., 1996, AJ, 112, 1461).
Taking into account all the overheads, the required observations are fully compatible with the visibility constraint checked with the dedicated APT tool.

Visit

Proposal 10565, Visit 01 Tue Jul 19 02:10:34 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=0.146 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.3 Angle Between Sides= Center Pattern=false		(1), (2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BO514	RA: 00 31 9.8300 (7.7909583d) Dec: +37 53 59.70 (37.89992d) Equinox: J2000 Plate Id: (?)	Radial Velocity: -456.0 km/sec	V=16.2+/-0.3 K=13.66	Coordinate Source: 2MASS XSC(www.ipac.caltech.edu/2mass/releases/allsky/doc/explsup.html)

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) BO514	ACS/WFC, ACCUM, WFC1	F606W	GAIN=2; CR-SPLIT=NO		Sequence 1-1 Non-Int Pattern 1-1 (1)	804.0 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(1) BO514	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO; GAIN=2		Sequence 2-2 Non-Int Pattern 2-2 (1)	806.0 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***

Orbit Structure