



15616 - Transient LMXBs in Globular Clusters

Cycle: 26, 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>
01	(2) TERZAN6-TRANSIENT	ACS/WFC	2	10-Jun-2019 18:00:12.0	yes

2 Total Orbits Used

ABSTRACT

Since the discovery of globular cluster LMXBs in the 1970s, it was long assumed there was only one luminous LMXB per cluster. Deep Chandra observations have revealed that globular clusters can contain numerous quiescent LMXBs, any of which could go into outburst. Our past Chandra programs have shown that globular clusters can indeed harbor multiple transients and that more quiescent LMXBs are hiding under the sensitivity limits of even relatively deep Chandra exposures. We propose to continue our Chandra program to precisely localize new transients in globular clusters, with the aim of gaining better insight into globular cluster LMXB populations. We further request HST observations to identify the optical counterparts of these transients, to allow for more detailed follow-up studies.

OBSERVING DESCRIPTION

NOTE added after the trigger: we have triggered this HST observation on an X-ray transient that has been detected in the globular cluster Terzan 6 by Swift. We have adjusted the target coordinates accordingly. In each orbit (one for F606W exposures, one for F814W exposures) we have fitted one short (30s) and five longer (about 370s) exposures. The Chandra ToO observation has been triggered as well, and will be executed in the week of June 10.

Observing description:

The goal of this joint Chandra/HST Target-of-Opportunity (ToO) proposal is to measure accurate coordinates of the next X-ray transient in a globular cluster with Chandra, and to use HST subsequently to look for the optical counterpart inside the Chandra positional error circle. The Chandra error circle is large enough (about 0.6" radius or less) that it likely contains multiple globular-cluster stars. Comparison of the photometry that is extracted from the observations requested here (to be taken about 25 days after triggering the proposal) with photometry from archival HST data reveals highly variable objects in the error circle, and hence the identity of the true counterpart. Our choice for the ACS/WFC is driven by the existence of a large body of archival globular-cluster images taken with this camera.

We have been allocated time to do Chandra/HST follow-up for one X-ray transient, and for this we were granted 2 HST orbits. Our program is made up of one visit that comprises two orbits. The first orbit is spent on observations in the F606W band, and the second orbit on observations in the F814W band. The structure of these two orbits is the same.

We start an orbit with a short exposure (30s) that is meant to get photometry of relatively bright stars that are saturated in the longer exposures. The short exposure is followed by 4 to 5 longer (about 360s) exposures; the exact number of exposures and the exposure times depend of the duration of the orbit and will be known once the target coordinates are known. We aim for a minimum number of long exposures of 4 so that they can be arranged in an ACS-DITHER-BOX pattern. In this Phase II file we have assumed that 5 long exposures can be accommodated. The first long exposure is to be taken at the target coordinates. The remaining 4 long exposures are put in a Pattern container that is coupled to the default ACS-DITHER-BOX pattern with center=yes. As a result these 4 exposures will surround the first long exposure. To elevate the background levels, we have added a post-flash of 25e- to the short exposure.

Proposal 15616 (STScI Edit Number: 2, Created: Monday, June 10, 2019 at 5:00:13 PM Eastern Standard Time) - Overview

Given the ToO nature of our program, our target has been defined as a generic target with unknown coordinates. Once the coordinates are known, we can fine-tune the observational setup, such as the exposure times and number of exposures, as well as the detailed placement of the target (i.e. the Chandra error circle) on the ACS/WFC detectors.

Proposal 15616 - Visit-Transient (01) - Transient LMXBs in Globular Clusters

Mon Jun 10 22:00:13 GMT 2019

Visit	Proposal 15616, Visit-Transient (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ON HOLD ; TOO RESPONSE TIME 25.0D <i>On Hold Comments: Target of Opportunity</i>									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=true		(2), (4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	TERZAN6-TRANSIENT	RA: 17 50 47.8000 (267.6991667d) Dec: -31 16 30.00 (-31.27500d) Equinox: J2000		V=13.85	Reference Frame: ICRS				
<i>Comments: Our target is a to-be-identified star in the globular cluster Terzan 6. The listed V-magnitude is the integrated V magnitude of the entire cluster. The counterpart that we aim to identify is expected to have a magnitude in F606W around 21 or fainter.</i> Category=STELLAR CLUSTER Description=[GLOBULAR CLUSTER]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	short-V	(2) TERZAN6-TRANSIENT	ACS/WFC, ACCUM, WFC1	F606W	FLASH=25			30 Secs (30 Secs)	
									[==>30.0 Secs]	[1]
	2	long-V-ditherbox	(2) TERZAN6-TRANSIENT	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 2-2 in Visit-Transient (01) (1)	359 Secs (1444 Secs)	
									[==>361.0 Secs (Pattern 1)] [==>361.0 Secs (Pattern 2)] [==>361.0 Secs (Pattern 3)] [==>361.0 Secs (Pattern 4)]	[1]
3	short-I	(2) TERZAN6-TRANSIENT	ACS/WFC, ACCUM, WFC1	F814W	FLASH=25			30 Secs (30 Secs)		
								[==>30.0 Secs]	[2]	
4	long-I-ditherbox	(2) TERZAN6-TRANSIENT	ACS/WFC, ACCUM, WFC1	F814W			Pattern 1, Exps 4-4 in Visit-Transient (01) (1)	384 Secs (1500 Secs)		
								[==>375.0 Secs (Pattern 1)] [==>375.0 Secs (Pattern 2)] [==>375.0 Secs (Pattern 3)] [==>375.0 Secs (Pattern 4)]	[2]	

Orbit Structure



