15403 - Unmask the true identity of MAXI J1749-200 before Halloween

Cycle: 25, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Cristina Pallanca (PI) (ESA Member) (Contact)	**Universita di Bologna**	**cristina.pallanca3@unibo.it**
Prof. Francesco R. Ferraro (CoI) (ESA Member)	Universita di Bologna	francesco.ferraro3@unibo.it
Dr. Barbara Lanzoni (CoI) (ESA Member)	Universita di Bologna	barbara.lanzoni3@unibo.it
Mr. Mario Cadelano (CoI) (ESA Member)	Universita di Bologna	mario.cadelano@unibo.it

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) MAXIJ1749-200	WFC3/UVIS	2	17-Oct-2017 13:01:59.0	yes

2 Total Orbits Used

ABSTRACT

Low mass X-ray binaries (LMXBs) and radio Millisecond Pulsars (MSPs) are thought to be the initial and ending points of the evolution of a binary system where a neutron star (NS) accretes matter from a companion. Many crucial phases of this scenario still need to be understood and a new, unexpected tile has been added to the mosaic very recently: a few systems (named "transitional MSPs") are observed to swing between the accretion-powered and the rotation-powered states. The case of the X-ray burster MAXI J1749-200 in the globular cluster NGC 6440 can act the part of the (still unexplored) stage immediately preceding the swinging phase. Swift observations located the source with an uncertainty of 3.5" and suggest a positional coincidence with two previously known x-ray sources, among which SAX J1748.9-2021, an already known X-ray accreting Millisecond pulsar.

Since the X-ray bursts are expected to be accompanied by a significant enhancement of the optical luminosity, here we propose to invest only 2 HST

orbits to acquire multi-filter images of the region. The comparison between these data (secured during the outburst) and those already available in the archive (acquired during quiescence) will immediately pinpoint the source, allowing to identify the companion to the NS and to characterize the nature of the on-going mass-transfer. The optical emission is expected to fade away in a time-scale of 1-2 months after the X-ray burst. Hence, the proposed DDT observations represent a unique but temporary opportunity to unveil the nature of this possibly new X-ray transient

OBSERVING DESCRIPTION

Observations are organized in 1 visit of 2 orbits.
In each orbit 2 long exposures in the optical filters F606W and F814W and 2 long exposures in the narrow filter F656N are planned.
Dithering is performed by applying small offsets (via POS TARG keyword) to each exposure using a path already tested in the past. The target is located at the aperture UVIS1; with this configuration we are also able to sample the entire cluster core.
We also added proper post-flashes when necessary.

Visit

Proposal 15403, Visit 01 Tue Oct 17 17:02:01 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MAXIJ1749-200	RA: 17 48 52.3400 (267.2180833d) Dec: -20 21 32.20 (-20.35894d) Equinox: J2000		V=21	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	V1_pos1	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F606W				382 Secs (382 Secs)	
								[==>]	***[1]***
2	Ha1_pos1	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=12	SAME POS AS 1		914 Secs (914 Secs)	
								[==>]	***[1]***
3	Ha2_pos2	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=12	POS TARG -0.099,-0.165		914 Secs (914 Secs)	
								[==>]	***[1]***
4	I1_pos2	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F814W	FLASH=6	SAME POS AS 3		222 Secs (222 Secs)	
								[==>]	***[1]***
5	V2_pos3	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F606W		POS TARG 0.059,-0.095		382 Secs (382 Secs)	
								[==>]	***[2]***
6	Ha3_pos3	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=12	SAME POS AS 5		969 Secs (969 Secs)	
								[==>]	***[2]***
7	Ha4_pos4	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=12	POS TARG 0.218,-0.024		969 Secs (969 Secs)	
								[==>]	***[2]***
8	I2_pos4	(1) MAXIJ1749-200	WFC3/UVIS, ACCUM, UVIS1	F814W	FLASH=6	SAME POS AS 7		223 Secs (223 Secs)	
								[==>]	***[2]***

Orbit Structure