13942 - Does the IMF vary with galaxy mass? The X-ray binary population of a key galaxy, NGC7457

Cycle: 22, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Mark B. Peacock (PI) (Contact)	**Michigan State University**	**mpeacock@msu.edu**
Prof. Stephen E. Zepf (CoI)	Michigan State University	zepf@pa.msu.edu
Dr. Thomas J. Maccarone (CoI)	Texas Tech University	thomas.maccarone@ttu.edu
Dr. Arunav Kundu (CoI)	Eureka Scientific Inc.	akundu@eurekasci.com
Prof. Anthony H. Gonzalez (CoI)	University of Florida	anthony@astro.ufl.edu
Dr. Bret Lehmer (CoI)	The Johns Hopkins University	blehmer@pha.jhu.edu
Prof. Claudia Maraston (CoI) (ESA Member)	University of Portsmouth	claudia.maraston@port.ac.uk

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) NGC7457	ACS/WFC	1	30-Sep-2014 21:26:44.0	yes
02	(1) NGC7457	ACS/WFC	1	30-Sep-2014 21:26:46.0	yes

2 Total Orbits Used

ABSTRACT

We propose a 100ksec Chandra observation of NGC7457. The primary goal of this observation is to test for variations in the initial mass function (IMF). Many recent studies have proposed that the IMF varies systematically as a function of early-type galaxy mass. This has potentially dramatic consequences and must to be confirmed. The number of LMXBs in a galaxy (per stellar luminosity) can be used to provide an independent test of

this hypothesis (see Peacock et al. 2014). Unfortunately, only galaxies with intermediate to high masses currently have the data needed to perform this test. The proposed observation of the elliptical galaxy NGC7457 will detect an order of magnitude more LMXBs in a low mass galaxy - hence providing the crucial constraint needed to significantly test for a variable IMF. As part of this proposal, we require two HST orbits to obtain high spatial resolution photometry that covers the D_25 ellipse of this galaxy. This will enable us to identify optical counterparts to the X-ray sources detected and thereby classify them in to field LMXBs, globular cluster LMXBs and background AGN.

OBSERVING DESCRIPTION

We will observe 2 ACS/WFC fields along the major axis of NGC7457. Each field will be observed for 1 orbit - producing a small 1*2 mosaic.

Due to the high ellipticity of the galaxy, we require that the observations are taken at an angle of 52.5 degrees. This will align the images with the major axis of the galaxy, allowing us to cover its entire D_25 ellipse. A range of 50-55 degrees acceptable, as is a 180 degree rotation (230-235).

Both fields will be observed with the ACS-WFC-DITHER-LINE dither pattern, with two points and the default separation. This will cover the chip gap and can be used to remove cosmic rays and hot pixels (we therefore set CR-SPLIT=0).

Both fields will be observed through the F475W and F850LP filters with total exposure times of:
F475W = 1100s (2*550s)
F850LP = 1050s (2*525s)

The ACS/WFC ETC predicts that these exposure times will give 3 sigma detection limits of F475W(AB)=27.6 and F850LP(AB)=25.9. This will be sufficient to achieve our scientific objective of identifying the optical counterparts to X-ray sources in these fields.

Visit

Proposal 13942, Tile NGC7457-NW (01) Wed Oct 01 01:26:47 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 50D TO 55 D; ORIENT 230D TO 235 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1-2)

Fixed Targets

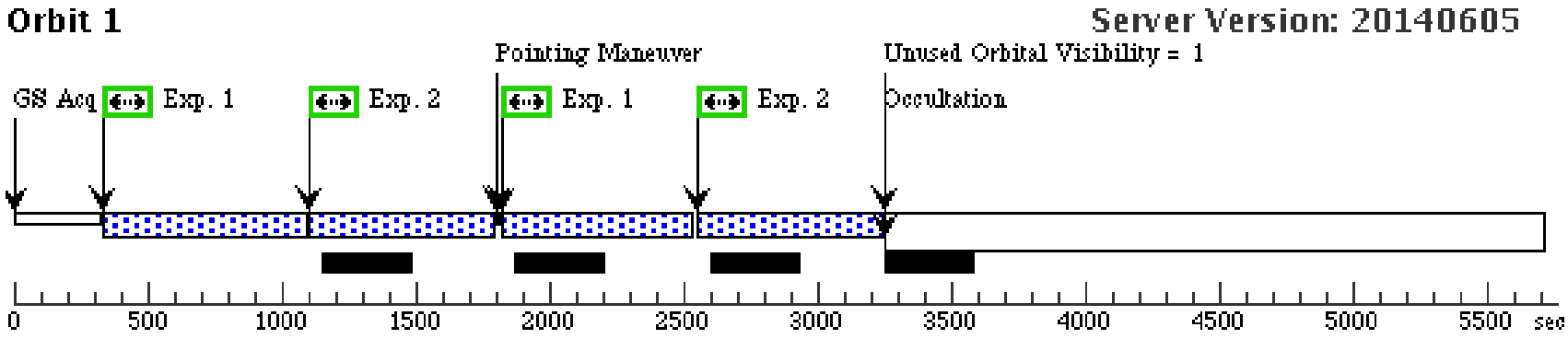
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC7457	RA: 23 00 59.9340 (345.2497250d) Dec: +30 08 41.61 (30.14489d) Equinox: J2000		V=11.87	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) NGC7457	ACS/WFC, ACCUM, WFCENTER	F475W	CR-SPLIT=NO	POS TARG -91.900 90701096506,-6.426 337441993791	Pattern 1, Exps 1-2 in Tile NGC7457-NW (01) (1)	551 Secs (1102 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(1) NGC7457	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO	POS TARG -91.900 90701096506,-6.426 337441993791	Pattern 1, Exps 1-2 in Tile NGC7457-NW (01) (1)	525 Secs (1050 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure



Visit

Proposal 13942, Tile NGC7457-SE (02) Wed Oct 01 01:26:47 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: SAME ORIENT AS 01

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1-2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC7457	RA: 23 00 59.9340 (345.2497250d) Dec: +30 08 41.61 (30.14489d) Equinox: J2000		V=11.87	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) NGC7457	ACS/WFC, ACCUM, WFCENTER	F475W	CR-SPLIT=NO	POS TARG 91.9009 0701096506,6.42633 7441993791	Pattern 1, Exps 1-2 in Tile NGC7457-SE (02) (1)	551 Secs (1102 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(1) NGC7457	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO	POS TARG 91.9009 0701096506,6.42633 7441993791	Pattern 1, Exps 1-2 in Tile NGC7457-SE (02) (1)	525 Secs (1050 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure