



14198 - Establishing the nature of the far-UV emission from the double pulsar.

Cycle: 23, 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	(3) S611010425	STIS/CCD	1	24-Jul-2015 22:22:20.0	yes
02	(3) S611010425	STIS/CCD	1	24-Jul-2015 22:22:21.0	yes
03	(3) S611010425	STIS/CCD	1	24-Jul-2015 22:22:22.0	yes
04	(3) S611010425	STIS/CCD	1	24-Jul-2015 22:22:23.0	yes

4 Total Orbits Used

ABSTRACT

The unique double neutron star (NS) binary J0737-3039 contains two pulsars, the recycled millisecond pulsar A and the ordinary old pulsar B. Pulsar A is expected to dominate the optical to X-ray spectrum. X-ray observations, mainly sensitive to a hot (polar cap) emission component, do not constrain the whole NS surface temperature. In our previous HST observation we detected the far-UV (FUV) emission but only in one broad filter. However, from a single flux measurement one cannot infer the physical nature and origin of emission (thermal from the NS surface or nonthermal from the pulsar magnetosphere). The FUV emission is too faint to detect it with another filter, but deep optical observation will allow us to discriminate between the two possibilities. If thermal nature of the FUV emission is confirmed, it would establish the remarkably high NS surface

temperature requiring revision of existing NS cooling models.

OBSERVING DESCRIPTION

We are using 4 STIS/CCD orbits to detect (or set an upper limit on) optical emission from the double-pulsar system. The STIS/CCD will be operated using CLEAR aperture to maximize the sensitivity. The science target (double pulsar J0737-3039) is 3.1 arcsec away from the reference star (GSC 2.3 identifier is S611010425; B=14 Jpg=13.88 N=13.47 Fpg=13.21) that will be used for acquisition but then will be occulted by the coronagraph. We will use WEDGEA2.5 aperture. Observations are organized in four consecutive visits. At the beginning of each orbit the star will be re-acquired (i.e. unocculted STIS/CCD50 image is taken) and then it will be occulted by the coronagraph for the rest of the orbit. In addition to its primary purpose, the acquisition image will be used in order to help to model the diffracted and scattered light. Acquisition images are 2-s long which allows to avoid saturation. The science exposures are divided into 3 CR-SPLIT subexposures (each 817 s long).

The first visit is restricted to two pre-determined roll angles ranges to avoid blocking the science target (J0737-3039) by the coronagraph wedge and to avoid placing it within the diffraction spikes of the bright star S611010425. These restrictions have a margin of +15 degrees to accommodate for the incremental ORIENT increase in the subsequent visits each of which is required to have ORIENT increment of 3-5 degrees compared to the previous visit. All four visits will happen during consecutive four orbits.

Proposal 14198 - Visit 01 - Establishing the nature of the far-UV emission from the double pulsar.

Sat Jul 25 02:22:24 GMT 2015

Visit	Proposal 14198, Visit 01, implementation										Sat Jul 25 02:22:24 GMT 2015
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: STIS/CCD										
	Special Requirements: ORIENT 340D TO 45 D; ORIENT 160D TO 235 D										
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections			Fluxes	Miscellaneous			
	(3)	S611010425	RA: 07 37 51.4590 (114.4644125d) Dec: -30 39 39.26 (-30.66091d) Equinox: J2000				V=14+/-0.5	Reference Frame: ICRS			
	Comments: The coordinates are based on the 2MASS position of the star and the UCAC4 proper motion of the star with the coordinates calculated for the year 2016 epoch.										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	(STIS.ta.718 379)	(3) S611010425	STIS/CCD, ACQ, 50CCD	MIRROR				2 Secs (2 Secs)		
									[==>]	[1]	
	2		(3) S611010425	STIS/CCD, ACCUM, WEDGEA2.5	MIRROR	CR-SPLIT=3			3000 Secs (2451 Secs) [==>817.0 Secs (Split 1)] [==>817.0 Secs (Split 2)] [==>817.0 Secs (Split 3)]	[1]	
Orbit Structure	Orbit 1 Server Version: 20150609 GS Acq Exp. 1 Pointing Maneuver Exp. 2, split 1 Exp. 2, split 2 Exp. 2, split 3 Occultation Unused Orbital Visibility = 0 Home										

Proposal 14198 - Visit 02 - Establishing the nature of the far-UV emission from the double pulsar.

Visit	Proposal 14198, Visit 02, implementation										Sat Jul 25 02:22:24 GMT 2015
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: STIS/CCD										
	Special Requirements: ORIENT 3D TO 5D FROM 01; AFTER 01 BY 0.5 Orbits TO 1.5 Orbits										
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(3)	S611010425	RA: 07 37 51.4590 (114.4644125d) Dec: -30 39 39.26 (-30.66091d) Equinox: J2000				V=14+/-0.5		Reference Frame: ICRS		
	Comments: The coordinates are based on the 2MASS position of the star and the UCAC4 proper motion of the star with the coordinates calculated for the year 2016 epoch.										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	(STIS.ta.718 379)	(3) S611010425	STIS/CCD, ACQ, 50CCD	MIRROR				2 Secs (2 Secs)		
									[==>]	[1]	
	2		(3) S611010425	STIS/CCD, ACCUM, WEDGEA2.5	MIRROR	CR-SPLIT=3			3000 Secs (2451 Secs)		
									[==>817.0 Secs (Split 1)] [==>817.0 Secs (Split 2)] [==>817.0 Secs (Split 3)]	[1]	
Orbit Structure	Orbit 1 Server Version: 20150609 GS Acq Exp. 1 Pointing Maneuver Exp. 2, split 1 Exp. 2, split 2 Exp. 2, split 3 Occultation Unused Orbital Visibility = 0 Home </										

Proposal 14198 - Visit 03 - Establishing the nature of the far-UV emission from the double pulsar.

Visit	Proposal 14198, Visit 03, implementation					Sat Jul 25 02:22:24 GMT 2015				
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/CCD									
	Special Requirements: ORIENT 3D TO 5D FROM 02; AFTER 02 BY 0.5 Orbits TO 1.5 Orbits									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(3)	S611010425	RA: 07 37 51.4590 (114.4644125d) Dec: -30 39 39.26 (-30.66091d) Equinox: J2000			V=14+/-0.5		Reference Frame: ICRS		
	Comments: The coordinates are based on the 2MASS position of the star and the UCAC4 proper motion of the star with the coordinates calculated for the year 2016 epoch.									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.718 379)	(3) S611010425	STIS/CCD, ACQ, 50CCD	MIRROR				2 Secs (2 Secs)	
									[==>]	[1]
	2		(3) S611010425	STIS/CCD, ACCUM, WEDGEA2.5	MIRROR	CR-SPLIT=3			3000 Secs (2451 Secs) [==>817.0 Secs (Split 1)] [==>817.0 Secs (Split 2)] [==>817.0 Secs (Split 3)]	[1]
Orbit Structure	Orbit 1 Server Version: 20150609 Unused Orbital Visibility = 0									

Proposal 14198 - Visit 04 - Establishing the nature of the far-UV emission from the double pulsar.

Sat Jul 25 02:22:24 GMT 2015

Visit	Proposal 14198, Visit 04, implementation										Sat Jul 25 02:22:24 GMT 2015
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: STIS/CCD										
	Special Requirements: ORIENT 3D TO 5D FROM 03; AFTER 03 BY 0.5 Orbits TO 1.5 Orbits										
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections			Fluxes	Miscellaneous			
	(3)	S611010425	RA: 07 37 51.4590 (114.4644125d) Dec: -30 39 39.26 (-30.66091d) Equinox: J2000				V=14+/-0.5	Reference Frame: ICRS			
	Comments: The coordinates are based on the 2MASS position of the star and the UCAC4 proper motion of the star with the coordinates calculated for the year 2016 epoch.										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	(STIS.ta.718 379)	(3) S611010425	STIS/CCD, ACQ, 50CCD	MIRROR				2 Secs (2 Secs)		
									[==>]	[1]	
	2		(3) S611010425	STIS/CCD, ACCUM, WEDGEA2.5	MIRROR	CR-SPLIT=3			3000 Secs (2451 Secs) [==>817.0 Secs (Split 1)] [==>817.0 Secs (Split 2)] [==>817.0 Secs (Split 3)]	[1]	
Orbit Structure	Orbit 1 Server Version: 20150609 Unused Orbital Visibility = 0 GS Acq Exp. 1 Pointing Maneuver Exp. 2, split 1 Exp. 2, split 2 Exp. 2, split 3 Occultation Home 0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 sec										