16841 - Extended hard X-ray emission, multi-phase ISM and AGN feedback in Compton-thick AGN ESO137-G034

Cycle: 29, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) ESO137-G034	WFC3/UVIS	2	13-Oct-2021 12:05:10.0	yes

2 Total Orbits Used

ABSTRACT

We propose deep Chandra ACIS observations and joint HST narrow band imaging of the nearby Compton-thick AGN ESO137-G034. The recent Chandra discovery of extended kpc-scale hard X-ray continuum (3-6 keV) and Fe Ka emission in Compton-thick AGN provides physical constraints on the obscuring torus and demonstrates the impact of the supermassive black hole (SMBH) on the host galaxy via feedback. Comparing deep Chandra data with multi-wavelength high resolution data (e.g. HST, ALMA, VLT/SINFONI), we will conduct an unprecedented comprehensive analysis of the extended X-ray emission, and the multi-phase interstellar media (i.e. cold and warm molecular gas, ionized gas, and dust) at sub-arcsec resolution to ultimately understand how the central SMBH interacts with and impacts the host galaxy.

OBSERVING DESCRIPTION

We are conducting new WFC3/UVIS narrow band imaging of [SII]6717,6730 and Hbeta, and corresponding continuum observations. Together with archival narrow band images of [OIII]5007 and Halpha, we will perform spacially resolved BPT mapping and diagnose excitation mechanisms in the different regions of NLR in ESO137-G034.

Based on the archival WFPC2 data of ESO137-G034 and our experience with silimar Seyfert galaxies, we designed the program to be conducted with one orbit per line. At z = 0.0090, [S II] lines shift to the F673N filter and we use the F763M filter to get the continuum, which is far enough from the Halpha complex. We initially planned to use the narrow filter F645N for [SII] continuum following our successful Cycle 25 program. For Hbeta, we need to use the quad filter FQ492N. We will use F547M for the contiuum, which is slightly contaminated by the [OIII]5007 line at very low throughput but can be modeled. We initially planned to use the archival [OIII] continuum as the continuum for Hbeta. Given that there is enough time, we would like to get a new continuum for Hbeta using the same instrument for easier data reduction and better quality. These medium band filters are broader and better for getting good continuum S/N than narrow band filters. The modification of continuum filters from Phase I are made due to more detailed checking of effective wavelength coverage, S/N, and actual available time.

We use a 4-point dither pattern for the lines and a 2-point dither pattern for the continuum to better sample the PSF and for cosmic removal. We have checked the FOV in Aladin to ensure good coverage.

Visit

Proposal 16841, ESO137-G034 (01), implementation Wed Oct 13 16:05:10 GMT 2021

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Diagnostics

(Hbeta (01.005)) Warning (Form): POS TARG & PATTERN should be used carefully with WFC3 quad filters to avoid placing the target on the vignetted part of the field of view or moving it to another quadrant.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(2), (5)

Fixed Targets

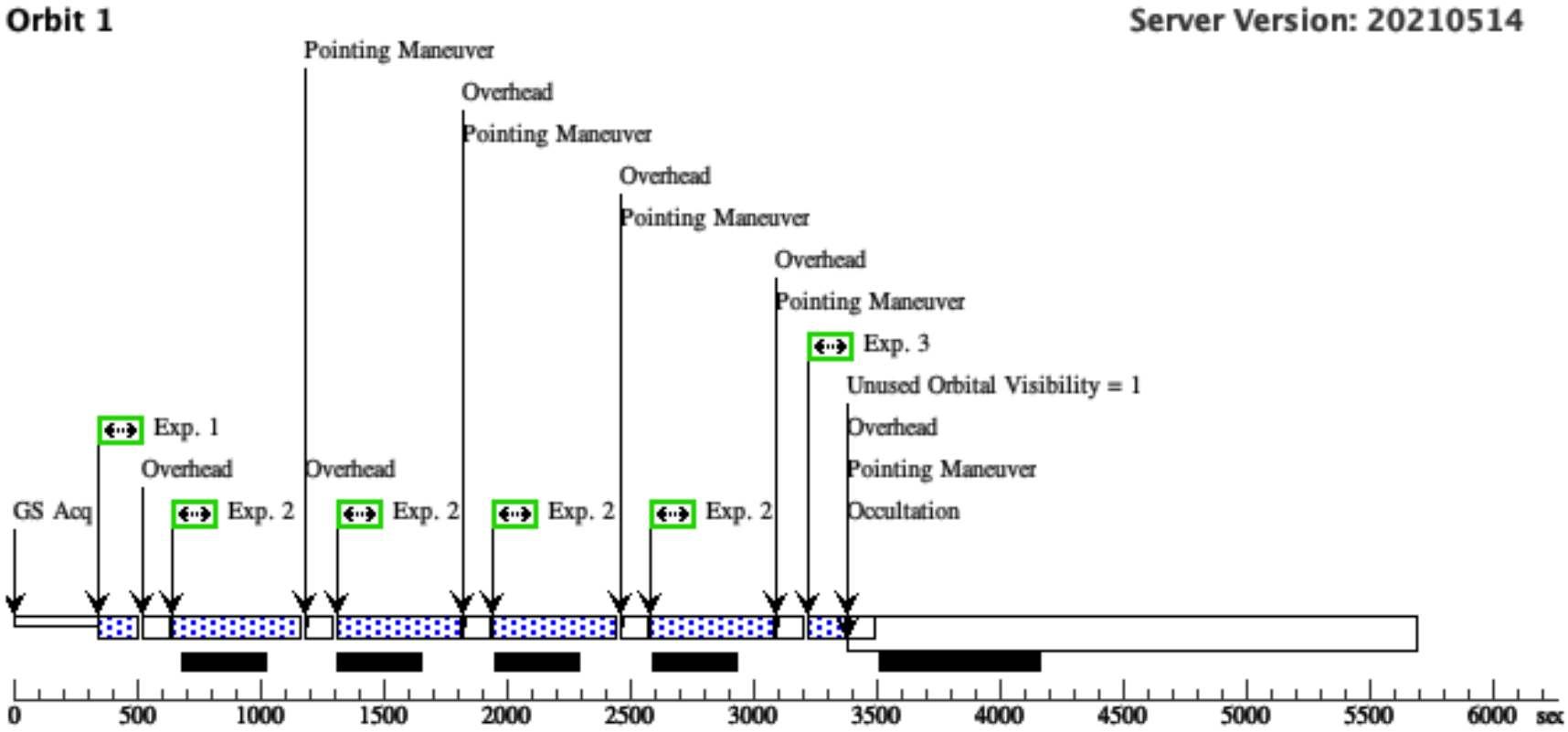
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ESO137-G034	RA: 16 35 14.1100 (248.8087917d) Dec: -58 04 48.10 (-58.08003d) Equinox: J2000	Epoch of Position: 2000	V=9.36	Reference Frame: ICRS

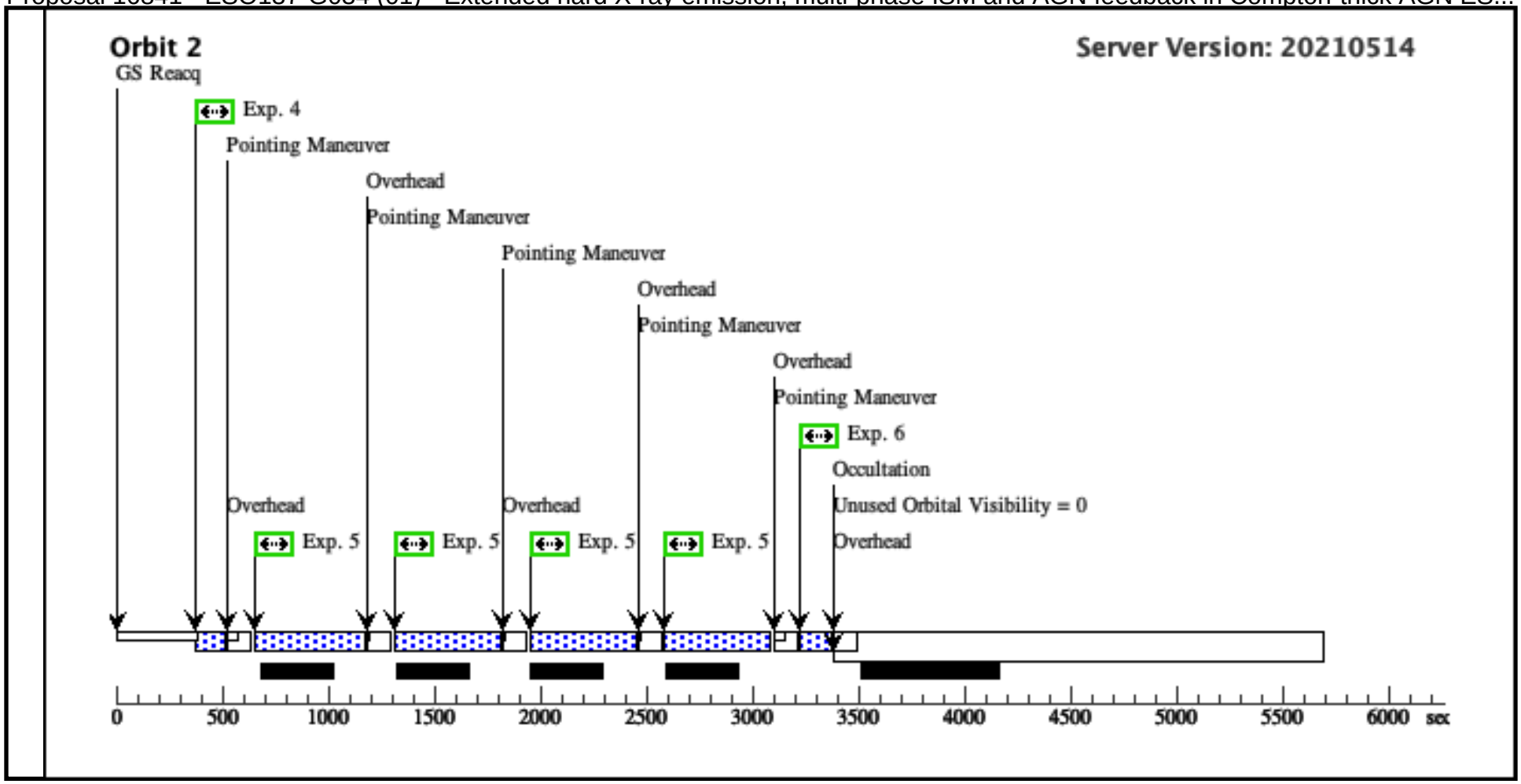
Comments:
Category=GALAXY
Description=[NLR, SEYFERT]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SII continuum	(1) ESO137-G034	WFC3/UVIS, ACCUM, UVIS2	F763M	FLASH=15			131 Secs (131 Secs)	
								[==>]	***[1]***
2	SII	(1) ESO137-G034	WFC3/UVIS, ACCUM, UVIS2	F673N	FLASH=15		Pattern 1, Exps 2-2 in ESO137-G034 (01) (1)	500 Secs (2000 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
3	SII continuum	(1) ESO137-G034	WFC3/UVIS, ACCUM, UVIS2	F763M	FLASH=15	POS TARG 0.1,0.1		131 Secs (131 Secs)	
								[==>]	***[1]***
4	Hbeta continuum	(1) ESO137-G034	WFC3/UVIS, ACCUM, UVIS2	F547M	FLASH=15			127 Secs (127 Secs)	
								[==>]	***[2]***
5	Hbeta	(1) ESO137-G034	WFC3/UVIS, ACCUM, UVIS-QUAD	FQ492N	FLASH=15		Pattern 1, Exps 5-5 in ESO137-G034 (01) (1)	500 Secs (2000 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***
6	Hbeta continuum	(1) ESO137-G034	WFC3/UVIS, ACCUM, UVIS2	F547M	FLASH=15	POS TARG 0.1,0.1		127 Secs (127 Secs)	
								[==>]	***[2]***

Orbit Structure




Orbit 2
Server Version: 20210514
GS Reacq
Exp. 4
Pointing Maneuver
Overhead
Pointing Maneuver
Pointing Maneuver
Overhead
Pointing Maneuver
Overhead
Pointing Maneuver
Exp. 6
Occultation
Unused Orbital Visibility = 0
Overhead
Overhead
Exp. 5
Exp. 5
Exp. 5
Exp. 5
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec