



13366 - The vertical disk structure of spiral galaxies and the origin of their thick disks

Cycle: 21, Proposal Category: GO
(Availability Mode: SUPPORTED)

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> | <i>E-Mail</i> |
|--|---|----------------------------|
| Dr. Roelof S. de Jong (PI) (ESA Member) (Contact) | Astrophysikalisches Institut Potsdam | rdejong@aip.de |
| Dr. Eric F. Bell (CoI) (AdminUSPI) | University of Michigan | ericbell@umich.edu |
| Mr. David Streich (CoI) (ESA Member) (Contact) | Leibniz-Institut für Astrophysik Potsdam | dstreich@aip.de |
| Dr. David J. Radburn-Smith (CoI) | University of Washington | david@astro.washington.edu |
| Dr. Antonela Monachesi (CoI) | University of Michigan | antonela@umich.edu |
| Dr. Jeremy Bailin (CoI) | University of Alabama | jbailin@ua.edu |
| Dr. Benne W. Holwerda (CoI) (ESA Member) | European Space Agency - ESTEC | benne.holwerda@esa.int |
| Dr. Ivan Minchev (CoI) (ESA Member) | Leibniz-Institut für Astrophysik Potsdam | iminchev@aip.de |

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> |
|--------------|------------------------------|-------------------------------------|--------------------|-------------------------------|-------------------------------|
| 02 | (2) NGC4631-DISK1 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:47:31.0 | yes |
| 03 | (3) NGC4631-DISK2 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:47:49.0 | yes |
| 04 | (4) NGC4631-DISK3 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:48:04.0 | yes |

| <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> |
|--------------|------------------------------|-------------------------------------|--------------------|-------------------------------|-------------------------------|
| 05 | (5) NGC4631-DISK4 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:48:18.0 | yes |
| 06 | (6) NGC4565-DISK1 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:48:27.0 | yes |
| 07 | (6) NGC4565-DISK1 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:48:34.0 | yes |
| 08 | (6) NGC4565-DISK1 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:48:41.0 | yes |
| 09 | (7) NGC4565-DISK2 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:48:48.0 | yes |
| 10 | (7) NGC4565-DISK2 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:48:55.0 | yes |
| 11 | (7) NGC4565-DISK2 | ACS/WFC WFC3/UVIS | 2 | 18-Jul-2013 21:49:02.0 | yes |

20 Total Orbits Used

ABSTRACT

Our knowledge of the formation and evolution of the main galactic components (bulge, disks, halo) has vastly increased in recent years, but especially the formation of thin and thick disks in spiral galaxies are still poorly understood. Despite the large number of galaxies for which the structural parameters of thin and thick disks have been measured, and the increasing amount of data about the Milky Way's disks, there is no consensus on the mechanism that drive the formation and evolution of thick disk components.

Thick disk formation models can be classified in three categories: 1) the thick disk is created in situ as a hot component from merging turbulent gas clouds at high redshift, 2) an original thin disk created from cold gas is heated by one or more dynamical processes (scattering off spiral arms, bars, molecular clouds in both vertical and radial direction, merger events, bombardment by dark matter subhalos), and 3) the thick disk consists of the remnants of accreted satellite galaxies. Each of these models is expected to leave distinct signatures in the radial and vertical distribution of stars of different ages.

Here we propose to use the unique HST capabilities to resolve the stellar disk contents of three nearby massive edge-on disk galaxies using ACS and WFC3 imaging. Resolving stellar populations in both vertical and radial direction allows us to disentangle stars of different ages and to measure their disk parameters separately. We can thus quantify the temporal evolution of scaleheights and scalelengths, and the amount of flaring in these galaxies, which will enable us to give definitive verdicts on the various thick disk formation scenarios.

OBSERVING DESCRIPTION

We propose to map the stellar content in the disks of three galaxies. We will use ACS and WFC3 coordinated parallel observations in F606W and F814W to resolve stellar populations. This work will build upon the GHOSTS survey, which has in place extensive tools to analyze resolved stellar populations from HST observations.

To differentiate the various models, the vertical and radial stellar profiles need to be measured as a function of stellar population. The GHOSTS survey results show that the various populations can be easily extracted from a color-magnitude diagram using the F606W and F814W filters. These two filters sufficiently separate the various populations, have good throughput and relatively little extinction compared to shorter wavelength filters. As we will use the existing GHOSTS fields to match the inner profiles we will continue to observe in F606W and F814W.

To resolve enough stars for each stellar population requires us to reach $S/N=6$ at least 1 mag below the Tip of the Red Giant Branch (TRGB). This TRGB occurs almost independent of metallicity at $M_I=4$ mag, with $V-I=1$. We have used the ETC and our GHOSTS experience to calculate the required exposure times for optimal PSF fit photometry based on the best available distances. Per orbit we will typically expose 1000s and 1400s in F606W and F814W with WFC3, and 1000s and 1200s with ACS, using a dither in each exposure for removal of cosmic rays and bad pixels.

ADDITIONAL COMMENTS

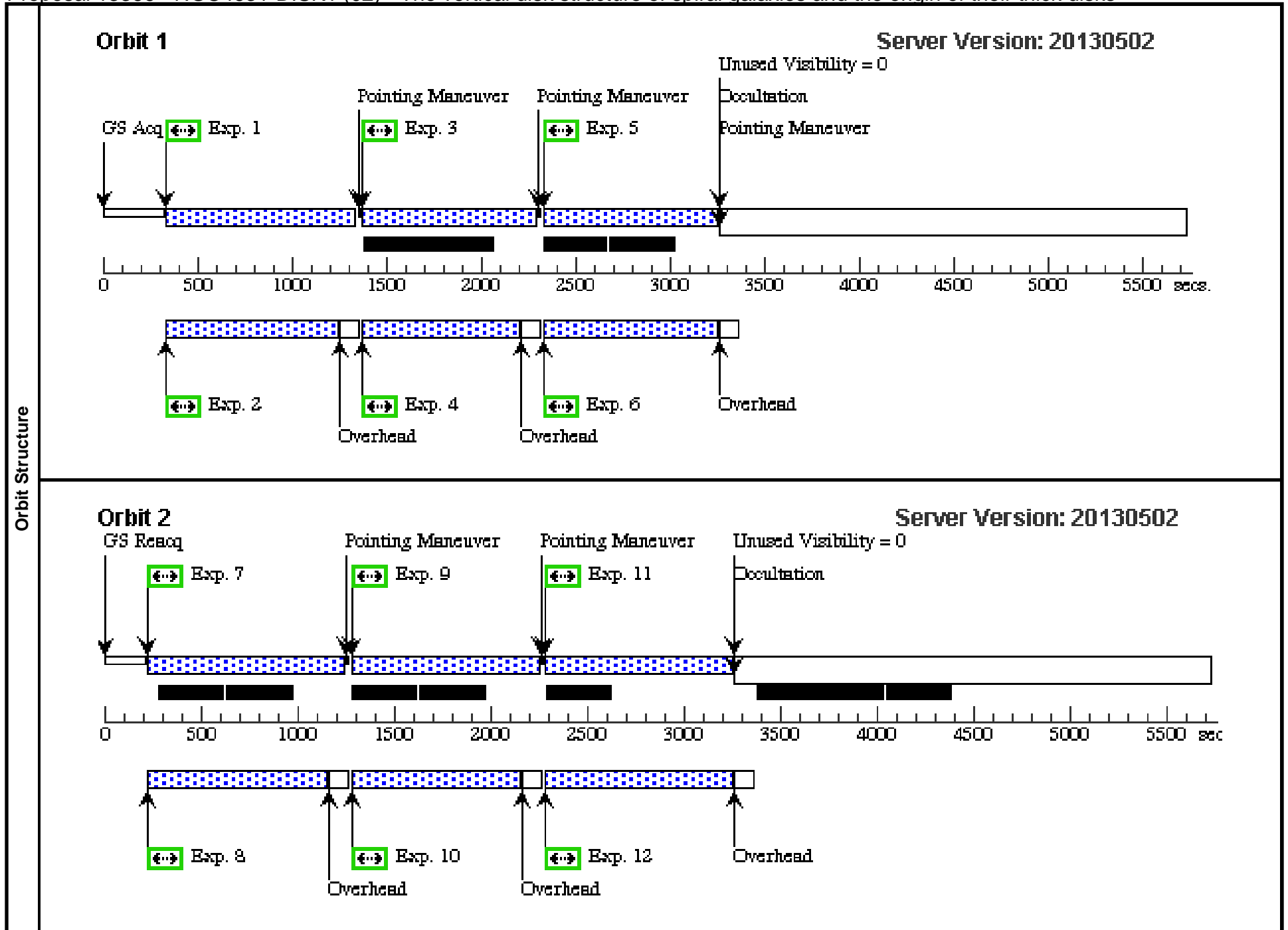
We use POSTARGS to do the dithering, as this gives us the largest flexibility to determine offsets and to pack the orbits efficiently with the ACS & WFC3 parallels. The POSTARGS also put the apertures outside the target position, but this is done on purpose such that the rotation point where the ACS and WFC3 parallel rotate around is in between the two cameras and the positional shift remains small for both cameras independent of the final ORIENT chosen.

Proposal 13366 - NGC4631-DISK1 (02) - The vertical disk structure of spiral galaxies and the origin of their thick disks

| Visit | Proposal 13366, NGC4631-DISK1 (02), implementation Fri Jul 19 01:49:11 GMT 2013 Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 160D TO 180 D; ORIENT 345D TO 360 D | | | | | | | | | | | | | | | | | |
|---------------|---|--|--------------------|--------------------------|----------------------|--------------------------|--------|---------------|-----|---------------|---|--|-------|----------------------|--|--|--|--|
| | Diagnostics | (NGC4631-DISK1 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-DISK1 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-DISK1 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE | | | | | | | | | | | | | | | | |
| Fixed Targets | | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">#</th> <th style="width: 20%;">Name</th> <th style="width: 30%;">Target Coordinates</th> <th style="width: 20%;">Targ. Coord. Corrections</th> <th style="width: 10%;">Fluxes</th> <th style="width: 15%;">Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(2)</td> <td>NGC4631-DISK1</td> <td>RA: 12 41 37.7680 (190.4073667d) Dec: +32 32 32.35 (32.54232d) Equinox: J2000</td> <td></td> <td>V=9.2</td> <td>Reference Frame: NED</td> </tr> </tbody> </table> | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | (2) | NGC4631-DISK1 | RA: 12 41 37.7680 (190.4073667d) Dec: +32 32 32.35 (32.54232d) Equinox: J2000 | | V=9.2 | Reference Frame: NED | Comments: This object was generated by the targetselector and retrieved from the NED database. | | | |
| | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | | | | | | | | | |
| (2) | NGC4631-DISK1 | RA: 12 41 37.7680 (190.4073667d) Dec: +32 32 32.35 (32.54232d) Equinox: J2000 | | V=9.2 | Reference Frame: NED | | | | | | | | | | | | | |

Proposal 13366 - NGC4631-DISK1 (02) - The vertical disk structure of spiral galaxies and the origin of their thick disks

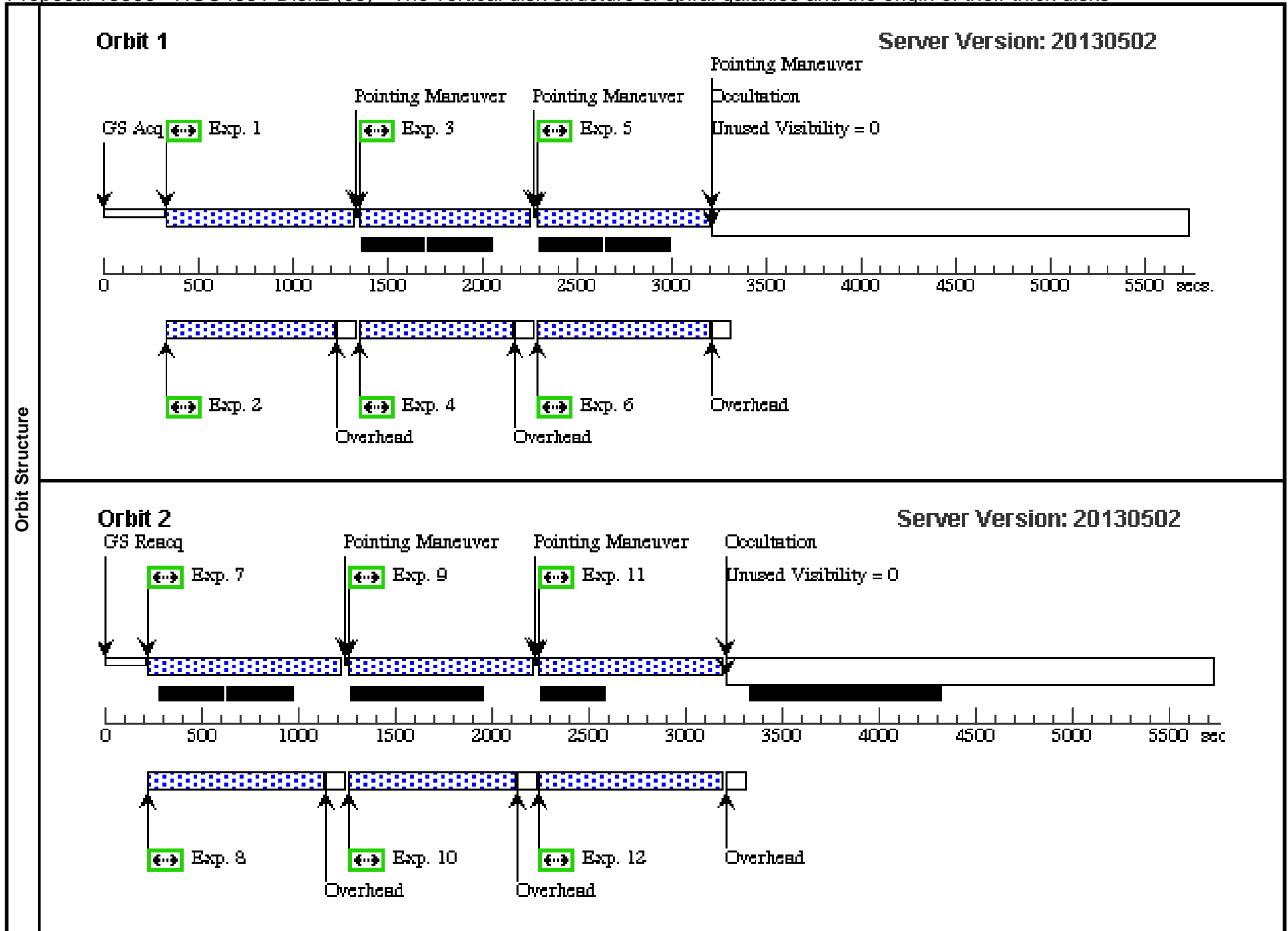
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|-----------|----|-----------------------|------------------------|------------------------|---------------|--------------|---|--|---------------------------------|-------|
| | 1 | | (2) NGC4631-DISK 1 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -149.22 63,124.8626; GS ACQ SCENARI O BASE1B3 | Prime + Parallel Gro up 1-2 in NGC4631- DISK1 (02) | 798 Secs (798 Secs) [==>] | [1] |
| | 2 | | (2) NGC4631-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 1-2 in NGC4631- DISK1 (02) | 880 Secs (880 Secs) [==>] | [1] |
| | 3 | | (2) NGC4631-DISK 1 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -149.01 20,124.9873 | Prime + Parallel Gro up 3-4 in NGC4631- DISK1 (02) | 798 Secs (798 Secs) [==>] | [1] |
| | 4 | | (2) NGC4631-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 3-4 in NGC4631- DISK1 (02) | 830 Secs (830 Secs) [==>] | [1] |
| | 5 | | (2) NGC4631-DISK 1 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -148.79 77,125.1120 | Prime + Parallel Gro up 5-6 in NGC4631- DISK1 (02) | 798 Secs (798 Secs) [==>] | [1] |
| | 6 | | (2) NGC4631-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 5-6 in NGC4631- DISK1 (02) | 924 Secs (924 Secs) [==>] | [1] |
| | 7 | | (2) NGC4631-DISK 1 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Gro up 7-8 in NGC4631- DISK1 (02) | 844 Secs (844 Secs) [==>] | [2] |
| | 8 | | (2) NGC4631-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 7-8 in NGC4631- DISK1 (02) | 908 Secs (908 Secs) [==>] | [2] |
| | 9 | | (2) NGC4631-DISK 1 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 3 | Prime + Parallel Gro up 9-10 in NGC4631- DISK1 (02) | 844 Secs (844 Secs) [==>] | [2] |
| | 10 | | (2) NGC4631-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 9-10 in NGC4631- DISK1 (02) | 876 Secs (876 Secs) [==>] | [2] |
| | 11 | | (2) NGC4631-DISK 1 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 5 | Prime + Parallel Gro up 11-12 in NGC463 1-DISK1 (02) | 844 Secs (844 Secs) [==>] | [2] |
| 12 | | (2) NGC4631-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 11-12 in NGC463 1-DISK1 (02) | 970 Secs (970 Secs) [==>] | [2] | |



Proposal 13366 - NGC4631-Disk2 (03) - The vertical disk structure of spiral galaxies and the origin of their thick disks

Fri Jul 19 01:49:15 GMT 2013

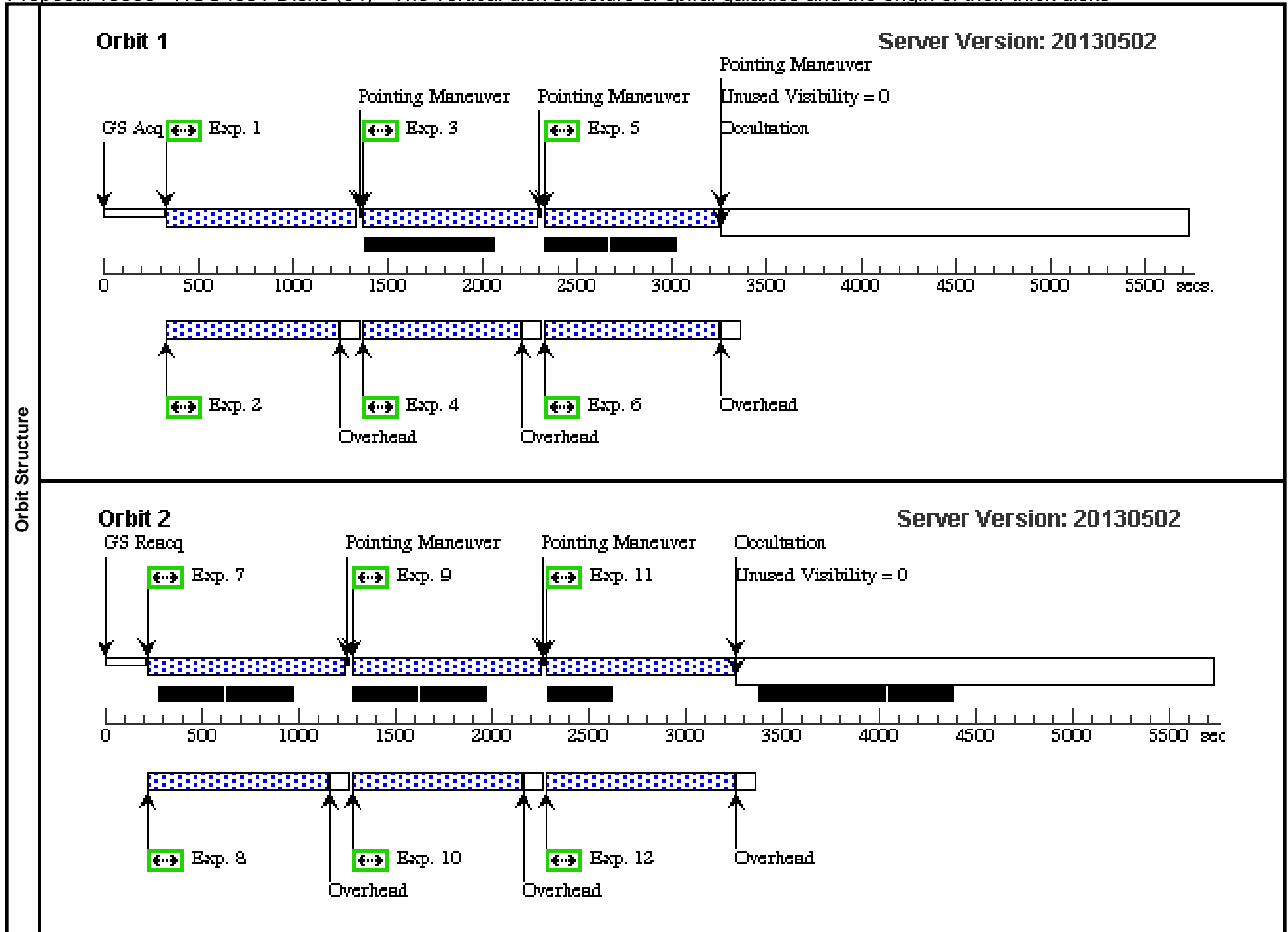
| Visit | Proposal 13366, NGC4631-Disk2 (03), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SCHED 50%: ORIENT 200D TO 225 D; ORIENT 35D TO 50 D | | | | | | | | | |
|---|---|--|---|------------------------|--------------------------|----------------------|---------------------------------|--|---------------------------------|-------|
| | Diagnostics | (NGC4631-Disk2 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-Disk2 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-Disk2 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE | | | | | | | | |
| Fixed Targets | | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | |
| | (3) | NGC4631-DISK2 | RA: 12 41 20.3180 (190.3346583d) Dec: +32 32 22.41 (32.53956d) Equinox: J2000 | | V=9.2 | Reference Frame: NED | | | | |
| <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (3) NGC4631-DISK 2 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -129.35 44,101.9909 | Prime + Parallel Group 1-2 in NGC4631-Disk2 (03) | 780 Secs (780 Secs) [==>] | [1] |
| | 2 | | (3) NGC4631-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 1-2 in NGC4631-Disk2 (03) | 862 Secs (862 Secs) [==>] | [1] |
| | 3 | | (3) NGC4631-DISK 2 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -129.14 01,102.1156 | Prime + Parallel Group 3-4 in NGC4631-Disk2 (03) | 780 Secs (780 Secs) [==>] | [1] |
| | 4 | | (3) NGC4631-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 3-4 in NGC4631-Disk2 (03) | 812 Secs (812 Secs) [==>] | [1] |
| | 5 | | (3) NGC4631-DISK 2 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -128.92 52,102.2402 | Prime + Parallel Group 5-6 in NGC4631-Disk2 (03) | 782 Secs (782 Secs) [==>] | [1] |
| | 6 | | (3) NGC4631-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 5-6 in NGC4631-Disk2 (03) | 908 Secs (908 Secs) [==>] | [1] |
| | 7 | | (3) NGC4631-DISK 2 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Group 7-8 in NGC4631-Disk2 (03) | 826 Secs (826 Secs) [==>] | [2] |
| | 8 | | (3) NGC4631-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 7-8 in NGC4631-Disk2 (03) | 890 Secs (890 Secs) [==>] | [2] |
| | 9 | | (3) NGC4631-DISK 2 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 3 | Prime + Parallel Group 9-10 in NGC4631-Disk2 (03) | 826 Secs (826 Secs) [==>] | [2] |
| | 10 | | (3) NGC4631-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 9-10 in NGC4631-Disk2 (03) | 858 Secs (858 Secs) [==>] | [2] |
| | 11 | | (3) NGC4631-DISK 2 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 5 | Prime + Parallel Group 11-12 in NGC4631-Disk2 (03) | 826 Secs (826 Secs) [==>] | [2] |
| | 12 | | (3) NGC4631-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 11-12 in NGC4631-Disk2 (03) | 954 Secs (954 Secs) [==>] | [2] |



Proposal 13366 - NGC4631-Disk3 (04) - The vertical disk structure of spiral galaxies and the origin of their thick disks

Fri Jul 19 01:49:16 GMT 2013

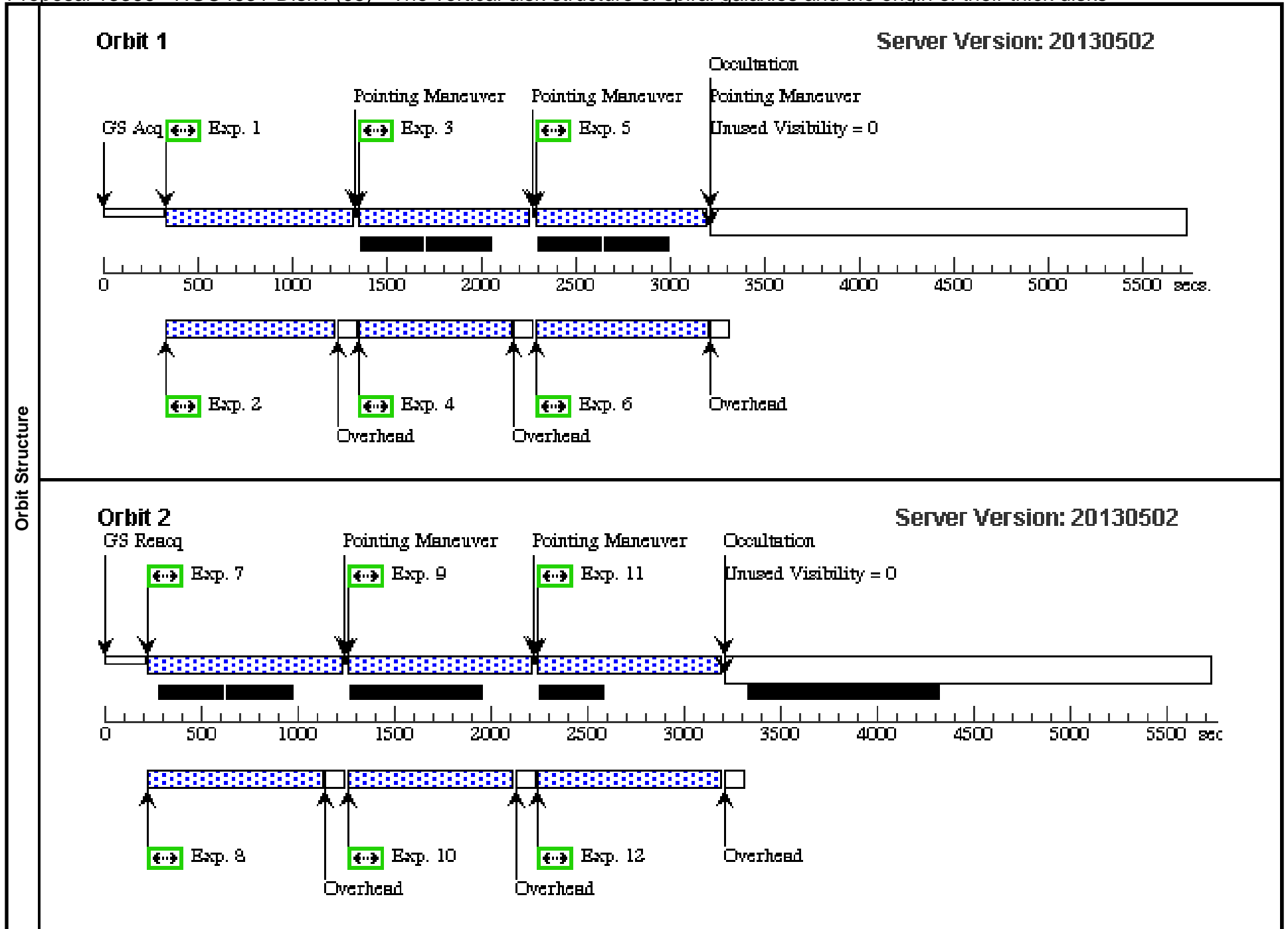
| Visit | Proposal 13366, NGC4631-Disk3 (04), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 240D TO 260 D; ORIENT 65D TO 80 D | | | | | | | | | |
|---|--|--|--|------------------------|--------------------------|----------------------|------------------------------|--|---------------------------------|-------|
| | Diagnostics | (NGC4631-Disk3 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-Disk3 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-Disk3 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE | | | | | | | | |
| Fixed Targets | | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | |
| | (4) | NGC4631-DISK3 | RA: 12 42 9.9233 (190.5413471d) Dec: +32 33 41.52 (32.56153d) Equinox: J2000 | | V=9.2 | Reference Frame: NED | | | | |
| <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (4) NGC4631-DISK3 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -127.45 95,116.1423 | Prime + Parallel Group 1-2 in NGC4631-Disk3 (04) | 798 Secs (798 Secs) [==>] | [1] |
| | 2 | | (4) NGC4631-DISK3 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 1-2 in NGC4631-Disk3 (04) | 880 Secs (880 Secs) [==>] | [1] |
| | 3 | | (4) NGC4631-DISK3 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -127.24 52,116.2670 | Prime + Parallel Group 3-4 in NGC4631-Disk3 (04) | 798 Secs (798 Secs) [==>] | [1] |
| | 4 | | (4) NGC4631-DISK3 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 3-4 in NGC4631-Disk3 (04) | 830 Secs (830 Secs) [==>] | [1] |
| | 5 | | (4) NGC4631-DISK3 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -127.03 03,116.3916 | Prime + Parallel Group 5-6 in NGC4631-Disk3 (04) | 798 Secs (798 Secs) [==>] | [1] |
| | 6 | | (4) NGC4631-DISK3 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 5-6 in NGC4631-Disk3 (04) | 924 Secs (924 Secs) [==>] | [1] |
| | 7 | | (4) NGC4631-DISK3 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Group 7-8 in NGC4631-Disk3 (04) | 844 Secs (844 Secs) [==>] | [2] |
| | 8 | | (4) NGC4631-DISK3 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 7-8 in NGC4631-Disk3 (04) | 908 Secs (908 Secs) [==>] | [2] |
| | 9 | | (4) NGC4631-DISK3 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 3 | Prime + Parallel Group 9-10 in NGC4631-Disk3 (04) | 844 Secs (844 Secs) [==>] | [2] |
| | 10 | | (4) NGC4631-DISK3 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 9-10 in NGC4631-Disk3 (04) | 876 Secs (876 Secs) [==>] | [2] |
| | 11 | | (4) NGC4631-DISK3 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 5 | Prime + Parallel Group 11-12 in NGC4631-Disk3 (04) | 844 Secs (844 Secs) [==>] | [2] |
| | 12 | | (4) NGC4631-DISK3 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 11-12 in NGC4631-Disk3 (04) | 970 Secs (970 Secs) [==>] | [2] |



Proposal 13366 - NGC4631-Disk4 (05) - The vertical disk structure of spiral galaxies and the origin of their thick disks

Fri Jul 19 01:49:18 GMT 2013

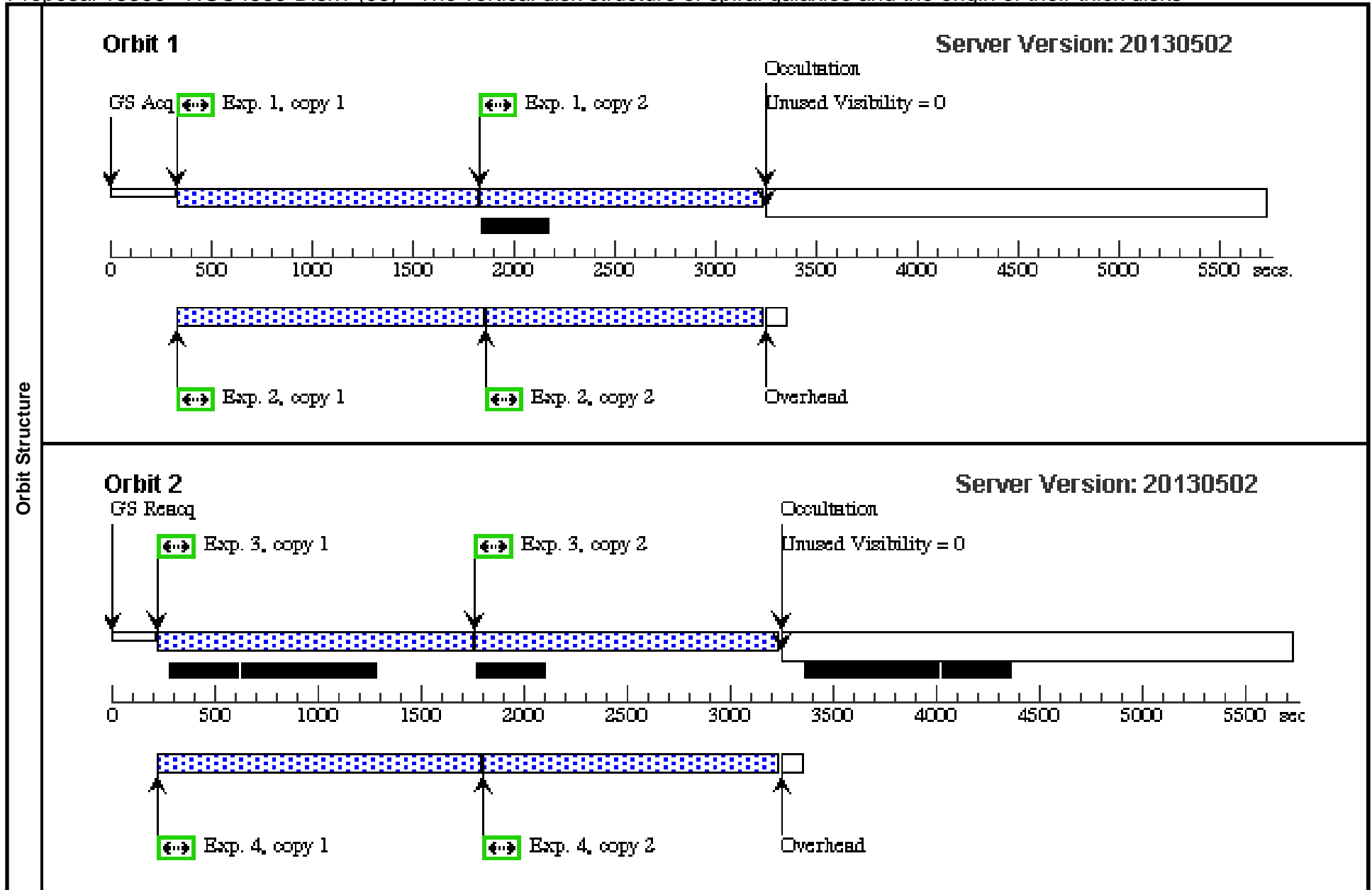
| | | | | | | | | | | |
|--|--|-------------------|---|---------------------------------|----------------------|-------------------------|-----------------------------|--|--|--------------|
| Visit | Proposal 13366, NGC4631-Disk4 (05), implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SCHED 50%; ORIENT 180D TO 210 D; ORIENT 0D TO 15 D | | | | | | | | | |
| | (NGC4631-Disk4 (05)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-Disk4 (05)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE (NGC4631-Disk4 (05)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | (5) | NGC4631-DISK4 | RA: 12 42 24.4369 (190.6018204d) Dec: +32 31 14.10 (32.52058d) Equinox: J2000 | | V=9.2 | Reference Frame: SIMBAD | | | | |
| <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> | | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -151.2345,132.6828 | Prime + Parallel Group 1-2 in NGC4631-Disk4 (05) | 781 Secs (781 Secs) [==>] | [1] |
| | 2 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 1-2 in NGC4631-Disk4 (05) | 863 Secs (863 Secs) [==>] | [1] |
| | 3 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -151.0202,132.8075 | Prime + Parallel Group 3-4 in NGC4631-Disk4 (05) | 781 Secs (781 Secs) [==>] | [1] |
| | 4 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 3-4 in NGC4631-Disk4 (05) | 811 Secs (811 Secs) [==>] | [1] |
| | 5 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG -150.8053,132.9321 | Prime + Parallel Group 5-6 in NGC4631-Disk4 (05) | 781 Secs (781 Secs) [==>] | [1] |
| | 6 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 5-6 in NGC4631-Disk4 (05) | 908 Secs (908 Secs) [==>] | [1] |
| | 7 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Group 7-8 in NGC4631-Disk4 (05) | 827 Secs (827 Secs) [==>] | [2] |
| | 8 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 7-8 in NGC4631-Disk4 (05) | 891 Secs (891 Secs) [==>] | [2] |
| | 9 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 3 | Prime + Parallel Group 9-10 in NGC4631-Disk4 (05) | 827 Secs (827 Secs) [==>] | [2] |
| | 10 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 9-10 in NGC4631-Disk4 (05) | 857 Secs (857 Secs) [==>] | [2] |
| | 11 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 5 | Prime + Parallel Group 11-12 in NGC4631-Disk4 (05) | 827 Secs (827 Secs) [==>] | [2] |
| | 12 | (5) NGC4631-DISK4 | (5) NGC4631-DISK4 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 11-12 in NGC4631-Disk4 (05) | 954 Secs (954 Secs) [==>] | [2] |



Proposal 13366 - NGC4565-Disk1 (06) - The vertical disk structure of spiral galaxies and the origin of their thick disks

Fri Jul 19 01:49:19 GMT 2013

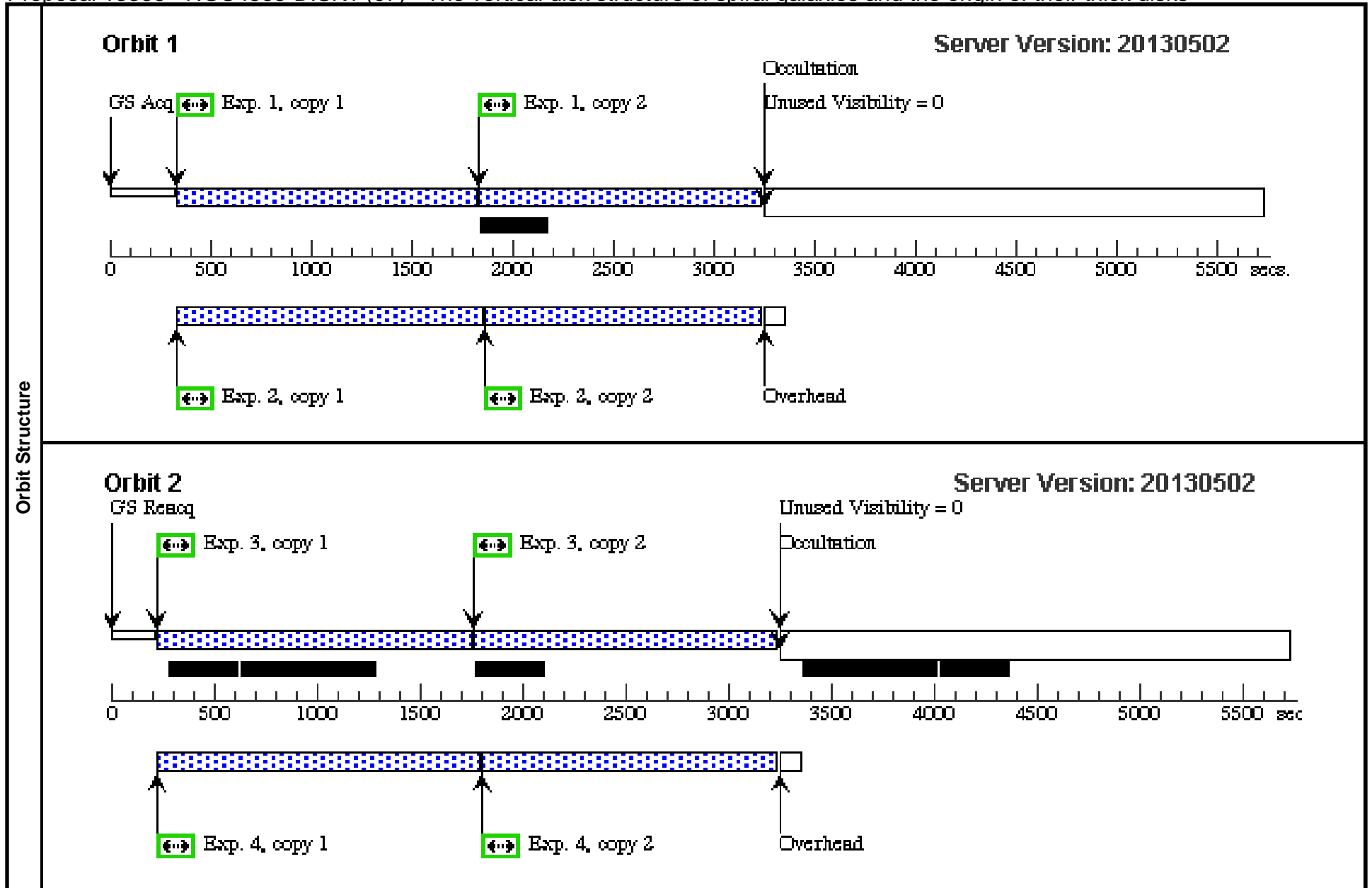
| Visit | Proposal 13366, NGC4565-Disk1 (06), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 85D TO 105 D | | | | | | | | | |
|-----------|--|---------------|---|------------------------|--------------------------|----------------------|--|--|---|-------|
| | Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | |
| | (6) | NGC4565-DISK1 | RA: 12 35 58.6792 (188.9944967d) Dec: +26 03 15.07 (26.05419d) Equinox: J2000 | | V=11.5 | Reference Frame: NED | | | | |
| | <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (6) NGC4565-DISK 1 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG 0,0; GS ACQ SCENARI O BASE1B3 | Prime + Parallel Gro up 1-2 in NGC4565- Disk1 (06) | 1285 Secs X 2 (2562 Secs) [==>1281.0 Secs (Copy 1)] [==>1281.0 Secs (Copy 2)] | [1] |
| | 2 | | (6) NGC4565-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 1-2 in NGC4565- Disk1 (06) | 1350 Secs X 2 (2748 Secs) [==>1374.0 Secs (Copy 1)] [==>1374.0 Secs (Copy 2)] | [1] |
| | 3 | | (6) NGC4565-DISK 1 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Gro up 3-4 in NGC4565- Disk1 (06) | 1350 Secs X 2 (2700 Secs) [==>(Copy 1)] [==>(Copy 2)] | [2] |
| | 4 | | (6) NGC4565-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 3-4 in NGC4565- Disk1 (06) | 1434 Secs X 2 (2868 Secs) [==>(Copy 1)] [==>(Copy 2)] | [2] |



Proposal 13366 - NGC4565-DISK1 (07) - The vertical disk structure of spiral galaxies and the origin of their thick disks

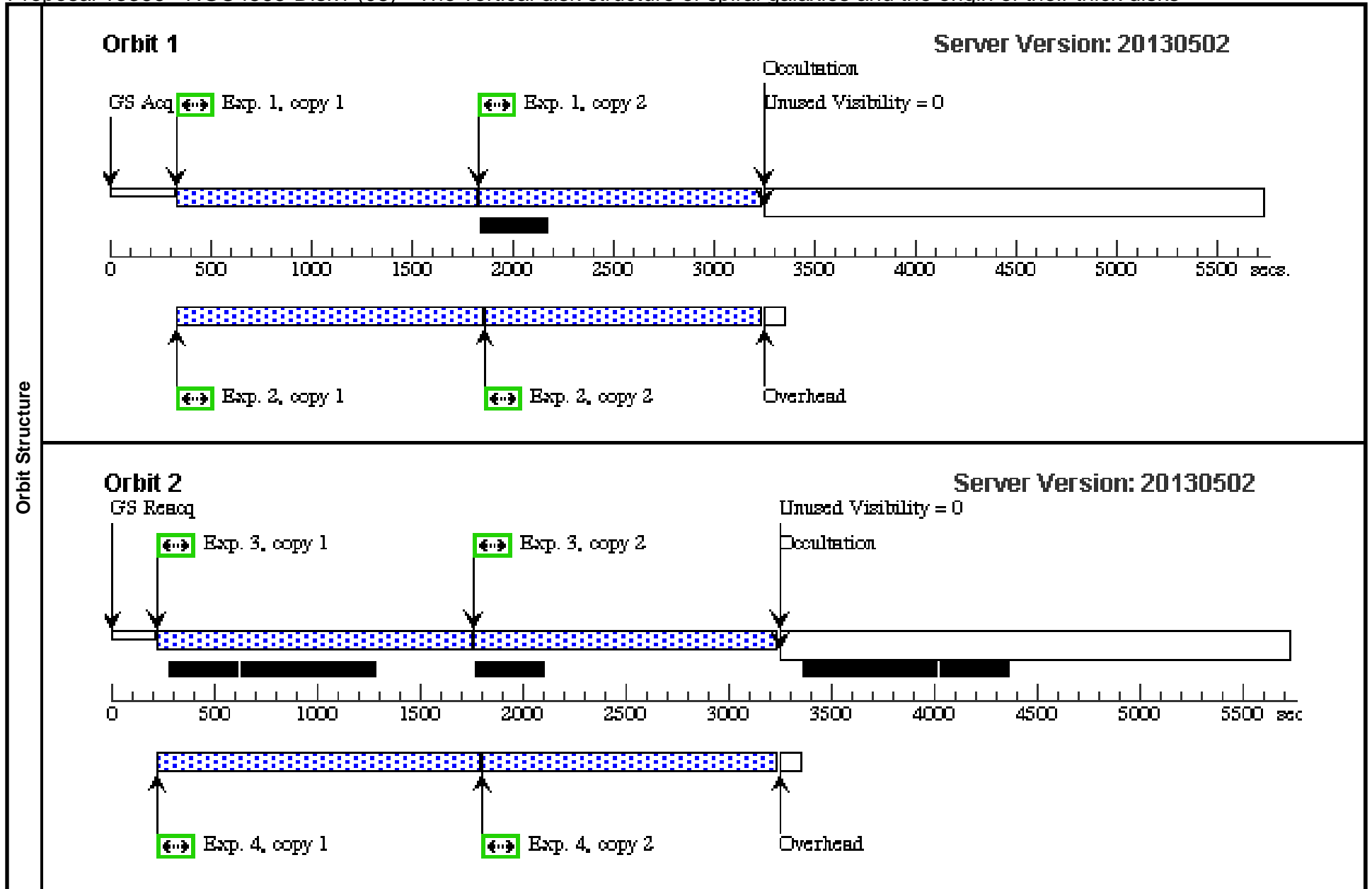
Fri Jul 19 01:49:20 GMT 2013

| Visit | Proposal 13366, NGC4565-DISK1 (07), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 06 | | | | | | | | | |
|-----------|--|---------------|---|------------------------|--------------------------|----------------------|---|--|---|-------|
| | Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | |
| | (6) | NGC4565-DISK1 | RA: 12 35 58.6792 (188.9944967d) Dec: +26 03 15.07 (26.05419d) Equinox: J2000 | | V=11.5 | Reference Frame: NED | <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (6) NGC4565-DISK1 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG 0.2143,0.1247; GS ACQ SCENARIO BASE1B3 | Prime + Parallel Group 1-2 in NGC4565-DISK1 (07) | 1281 Secs X 2 (2562 Secs) [=>(Copy 1)] [=>(Copy 2)] | [1] |
| | 2 | | (6) NGC4565-DISK1 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Group 1-2 in NGC4565-DISK1 (07) | 1374 Secs X 2 (2748 Secs) [=>(Copy 1)] [=>(Copy 2)] | [1] |
| | 3 | | (6) NGC4565-DISK1 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Group 3-4 in NGC4565-DISK1 (07) | 1350 Secs X 2 (2700 Secs) [=>(Copy 1)] [=>(Copy 2)] | [2] |
| | 4 | | (6) NGC4565-DISK1 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Group 3-4 in NGC4565-DISK1 (07) | 1434 Secs X 2 (2868 Secs) [=>(Copy 1)] [=>(Copy 2)] | [2] |



Proposal 13366 - NGC4565-Disk1 (08) - The vertical disk structure of spiral galaxies and the origin of their thick disks

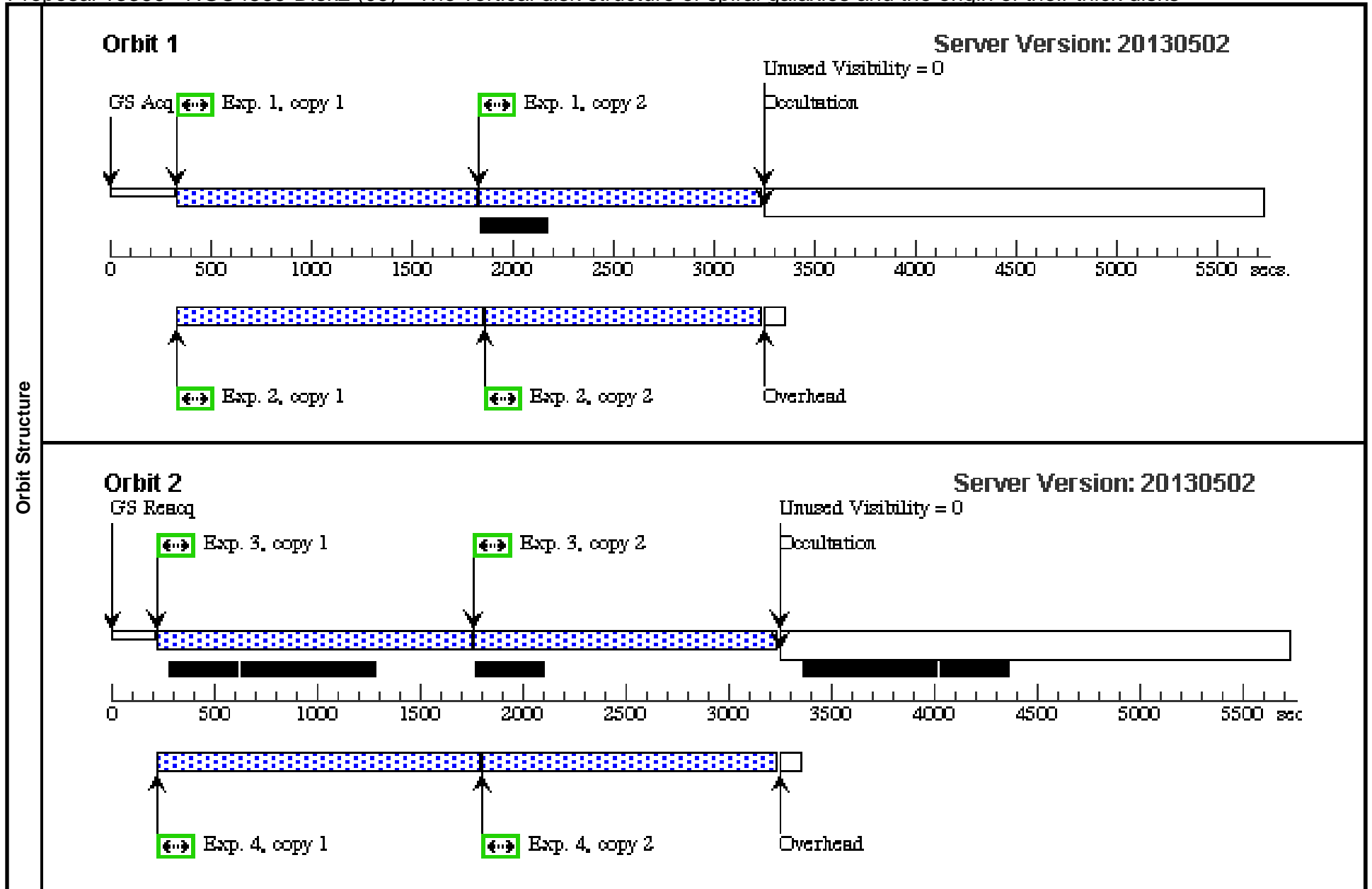
| Visit | Proposal 13366, NGC4565-Disk1 (08), implementation Fri Jul 19 01:49:21 GMT 2013 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 06 | | | | | | | | | |
|-----------|--|---------------|---|------------------------|--------------------------|----------------------|--|--|---|-------|
| | Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | |
| | (6) | NGC4565-DISK1 | RA: 12 35 58.6792 (188.9944967d) Dec: +26 03 15.07 (26.05419d) Equinox: J2000 | | V=11.5 | Reference Frame: NED | | | | |
| | <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (6) NGC4565-DISK 1 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG 0.4292,0 .2493; GS ACQ SCENARI O BASE1B3 | Prime + Parallel Gro up 1-2 in NGC4565- Disk1 (08) | 1281 Secs X 2 (2562 Secs) [=>(Copy 1)] [=>(Copy 2)] | [1] |
| | 2 | | (6) NGC4565-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 1-2 in NGC4565- Disk1 (08) | 1374 Secs X 2 (2748 Secs) [=>(Copy 1)] [=>(Copy 2)] | [1] |
| | 3 | | (6) NGC4565-DISK 1 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Gro up 3-4 in NGC4565- Disk1 (08) | 1350 Secs X 2 (2700 Secs) [=>(Copy 1)] [=>(Copy 2)] | [2] |
| | 4 | | (6) NGC4565-DISK 1 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 3-4 in NGC4565- Disk1 (08) | 1434 Secs X 2 (2868 Secs) [=>(Copy 1)] [=>(Copy 2)] | [2] |



Proposal 13366 - NGC4565-Disk2 (09) - The vertical disk structure of spiral galaxies and the origin of their thick disks

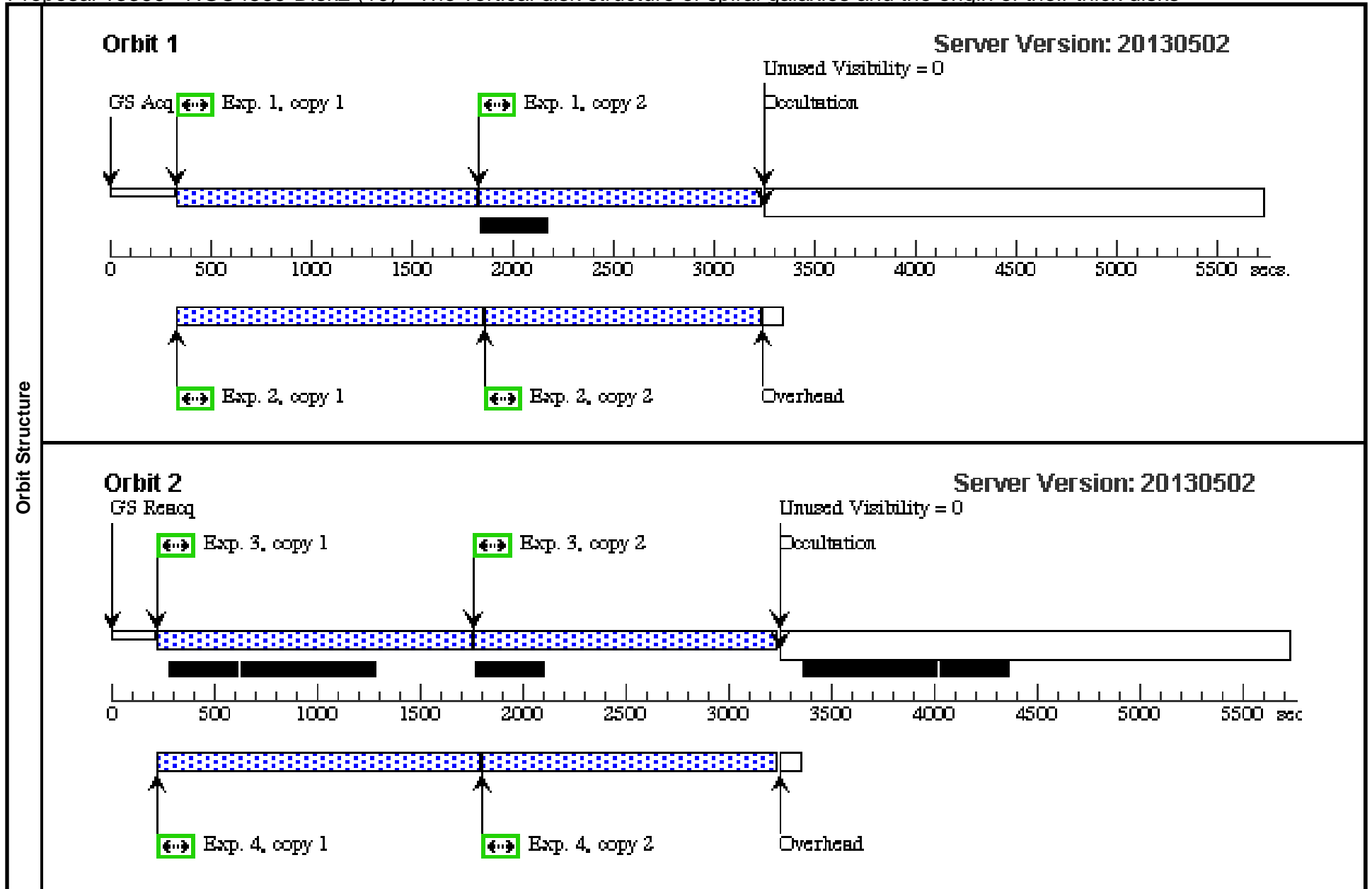
Fri Jul 19 01:49:22 GMT 2013

| Visit | Proposal 13366, NGC4565-Disk2 (09), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 110D TO 130 D | | | | | | | | | |
|-----------|---|---------------|---|------------------------|--------------------------|----------------------|-----------------------------|--|---|-------|
| | Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | |
| | (7) | NGC4565-DISK2 | RA: 12 36 15.0410 (189.0626708d) Dec: +26 02 45.92 (26.04609d) Equinox: J2000 | | V=11.5 | Reference Frame: NED | | | | |
| | <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (7) NGC4565-DISK 2 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | GS ACQ SCENARI O BASE1B3 | Prime + Parallel Gro up 1-2 in NGC4565- Disk2 (09) | 1285 Secs X 2 (2562 Secs) [==>1281.0 Secs (Copy 1)] [==>1281.0 Secs (Copy 2)] | [1] |
| | 2 | | (7) NGC4565-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 1-2 in NGC4565- Disk2 (09) | 1350 Secs X 2 (2748 Secs) [==>1374.0 Secs (Copy 1)] [==>1374.0 Secs (Copy 2)] | [1] |
| | 3 | | (7) NGC4565-DISK 2 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Gro up 3-4 in NGC4565- Disk2 (09) | 1350 Secs X 2 (2700 Secs) [==>(Copy 1)] [==>(Copy 2)] | [2] |
| | 4 | | (7) NGC4565-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 3-4 in NGC4565- Disk2 (09) | 1434 Secs X 2 (2868 Secs) [==>(Copy 1)] [==>(Copy 2)] | [2] |



Proposal 13366 - NGC4565-Disk2 (10) - The vertical disk structure of spiral galaxies and the origin of their thick disks

| Visit | Proposal 13366, NGC4565-Disk2 (10), implementation Fri Jul 19 01:49:23 GMT 2013 | | | | | | | | | |
|---------------|---|-------|-----------------------|---|---------------|---------------|--|--|---|-------|
| | Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 09 | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | | (7) | NGC4565-DISK2 | RA: 12 36 15.0410 (189.0626708d) Dec: +26 02 45.92 (26.04609d) Equinox: J2000 | | V=11.5 | Reference Frame: NED | | | |
| | <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (7) NGC4565-DISK 2 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG 0.2143,0 .1247; GS ACQ SCENARI O BASE1B3 | Prime + Parallel Gro up 1-2 in NGC4565- Disk2 (10) | 1281 Secs X 2 (2562 Secs) [==>(Copy 1)] [==>(Copy 2)] | [1] |
| | 2 | | (7) NGC4565-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 1-2 in NGC4565- Disk2 (10) | 1372 Secs X 2 (2744 Secs) [==>(Copy 1)] [==>(Copy 2)] | [1] |
| | 3 | | (7) NGC4565-DISK 2 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Gro up 3-4 in NGC4565- Disk2 (10) | 1350 Secs X 2 (2700 Secs) [==>(Copy 1)] [==>(Copy 2)] | [2] |
| | 4 | | (7) NGC4565-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 3-4 in NGC4565- Disk2 (10) | 1434 Secs X 2 (2868 Secs) [==>(Copy 1)] [==>(Copy 2)] | [2] |



Proposal 13366 - NGC4565-Disk2 (11) - The vertical disk structure of spiral galaxies and the origin of their thick disks

| Visit | Proposal 13366, NGC4565-Disk2 (11), implementation Fri Jul 19 01:49:23 GMT 2013 | | | | | | | | | |
|---------------|---|-------|-----------------------|---|---------------|---------------|--|--|---|-------|
| | Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 09 | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | | (7) | NGC4565-DISK2 | RA: 12 36 15.0410 (189.0626708d) Dec: +26 02 45.92 (26.04609d) Equinox: J2000 | | V=11.5 | Reference Frame: NED | | | |
| | <i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (7) NGC4565-DISK 2 | ACS/WFC, ACCUM, WFC | F606W | CR-SPLIT=NO | POS TARG 0.4292,0 .2493; GS ACQ SCENARI O BASE1B3 | Prime + Parallel Gro up 1-2 in NGC4565- Disk2 (11) | 1281 Secs X 2 (2562 Secs) [=>(Copy 1)] [=>(Copy 2)] | [1] |
| | 2 | | (7) NGC4565-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F606W | CR-SPLIT=NO | | Prime + Parallel Gro up 1-2 in NGC4565- Disk2 (11) | 1350 Secs X 2 (2700 Secs) [=>(Copy 1)] [=>(Copy 2)] | [1] |
| | 3 | | (7) NGC4565-DISK 2 | ACS/WFC, ACCUM, WFC | F814W | CR-SPLIT=NO | SAME POS AS 1 | Prime + Parallel Gro up 3-4 in NGC4565- Disk2 (11) | 1350 Secs X 2 (2700 Secs) [=>(Copy 1)] [=>(Copy 2)] | [2] |
| | 4 | | (7) NGC4565-DISK 2 | WFC3/UVIS, ACCUM, UVIS | F814W | CR-SPLIT=NO | | Prime + Parallel Gro up 3-4 in NGC4565- Disk2 (11) | 1434 Secs X 2 (2868 Secs) [=>(Copy 1)] [=>(Copy 2)] | [2] |

