



15377 - Does the Brightest Strongly Lensed Galaxy Contain An AGN?

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> | <i>E-Mail</i> |
|---|--|------------------------------|
| Dr. Matthew Bayliss (PI) (Contact) | Massachusetts Institute of Technology | mbbayliss@gmail.com |
| Dr. Jane R. Rigby (CoI) | NASA Goddard Space Flight Center | jane.r.rigby@nasa.gov |
| Prof. Keren Sharon (CoI) | University of Michigan | kerens@umich.edu |
| Dr. Haakon Dahle (CoI) (ESA Member) | University of Oslo | hdahle@astro.uio.no |
| Prof. Michael D. Gladders (CoI) | University of Chicago | gladders@oddjob.uchicago.edu |
| Prof. Michael A. McDonald (CoI) | Massachusetts Institute of Technology | mcdonald@space.mit.edu |
| Dr. Michael Florian (CoI) | NASA Goddard Space Flight Center | michael.k.florian@nasa.gov |
| Ms. Traci Lin Johnson (CoI) | University of Michigan | tljohn@umich.edu |
| Dr. Rachel Paterno-Mahler (CoI) | University of Michigan | rachelpm@umich.edu |
| Dr. Katherine E. Whitaker (CoI) | University of Connecticut | kate.whitaker@uconn.edu |

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 | (1) PSZ1-ARC | WFC3/IR WFC3/UVIS | 1 | 20-Mar-2019 09:00:28.0 | yes |
| 02 | (1) PSZ1-ARC | WFC3/IR WFC3/UVIS | 1 | 20-Mar-2019 09:00:29.0 | yes |
| 55 | (1) PSZ1-ARC | WFC3/IR WFC3/UVIS | 1 | 20-Mar-2019 09:00:30.0 | 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> |
|--------------|------------------------------|-------------------------------------|--------------------|-------------------------------|-------------------------------|
| 03 | (1) PSZ1-ARC | WFC3/IR WFC3/UVIS | 1 | 20-Mar-2019 09:00:31.0 | yes |
| 04 | (1) PSZ1-ARC | WFC3/UVIS | 1 | 20-Mar-2019 09:00:31.0 | yes |
| 54 | (1) PSZ1-ARC | WFC3/UVIS | 1 | 20-Mar-2019 09:00:32.0 | yes |

6 Total Orbits Used

ABSTRACT

We have recently discovered the brightest lensed galaxy known. Rest-frame UV through optical spectra reveal a wealth of spectral diagnostics, providing a unique window on the physical conditions of star formation at the epoch when most stars formed. The major caveat is that at present, we do not know whether this lensed galaxy hosts an AGN that is contributing substantially to the ionizing photon flux, effectively throwing off the nebular line diagnostics. We propose a 40 ks Chandra observation to definitively constrain the X-ray luminosity of an active nucleus, supported by a joint 6 orbit observation with HST to perform complementary UV narrow-band mapping and imaging to support strong lens modeling to interpret the geometry of the lens.

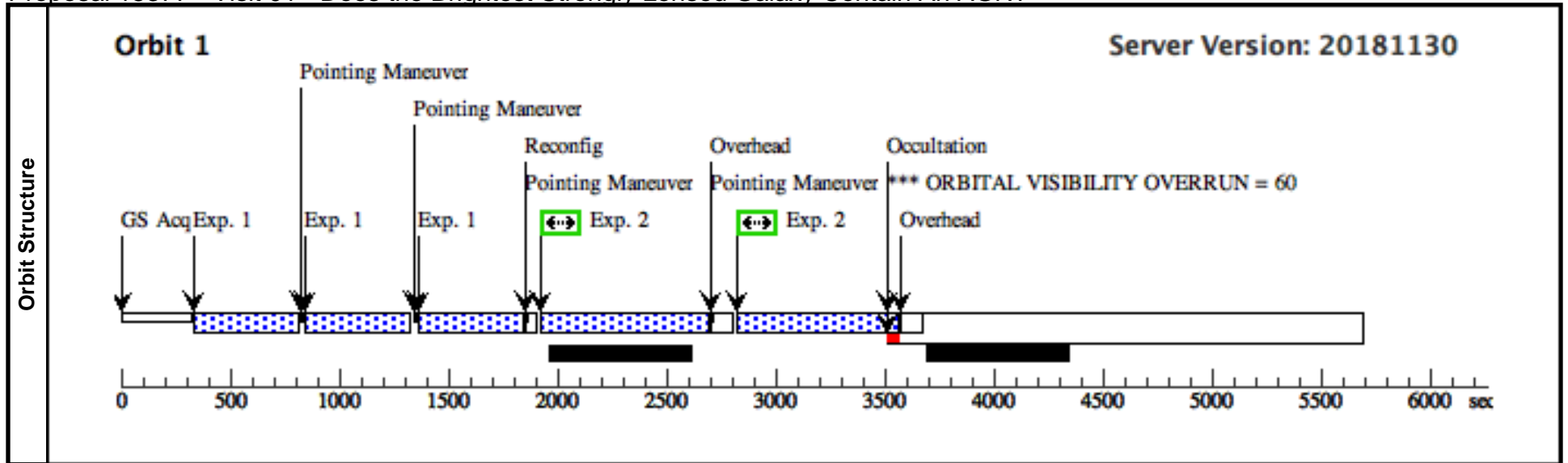
OBSERVING DESCRIPTION

The HST data being collected for this program includes optical and near-infrared imaging of the brightest strongly lensed galaxy currently known using the Wide-Field Camera 3 Infrared channel (WFC3/IR). We will collect four imaging bands, spanning the optical through NIR.. The data collected in this program will be combined with imaging in four additional broadband filters and one narrow/medium-band filter, as well as WFC3 prism spectroscopy, from a separate HST program, GO-15101. These HST data will be analyzed jointly with scheduled Chandra X-ray observations of the giant arc, as well as extensive ground-based data.

Proposal 15377 - Visit 01 - Does the Brightest Strongly Lensed Galaxy Contain An AGN?

Wed Mar 20 13:00:33 GMT 2019

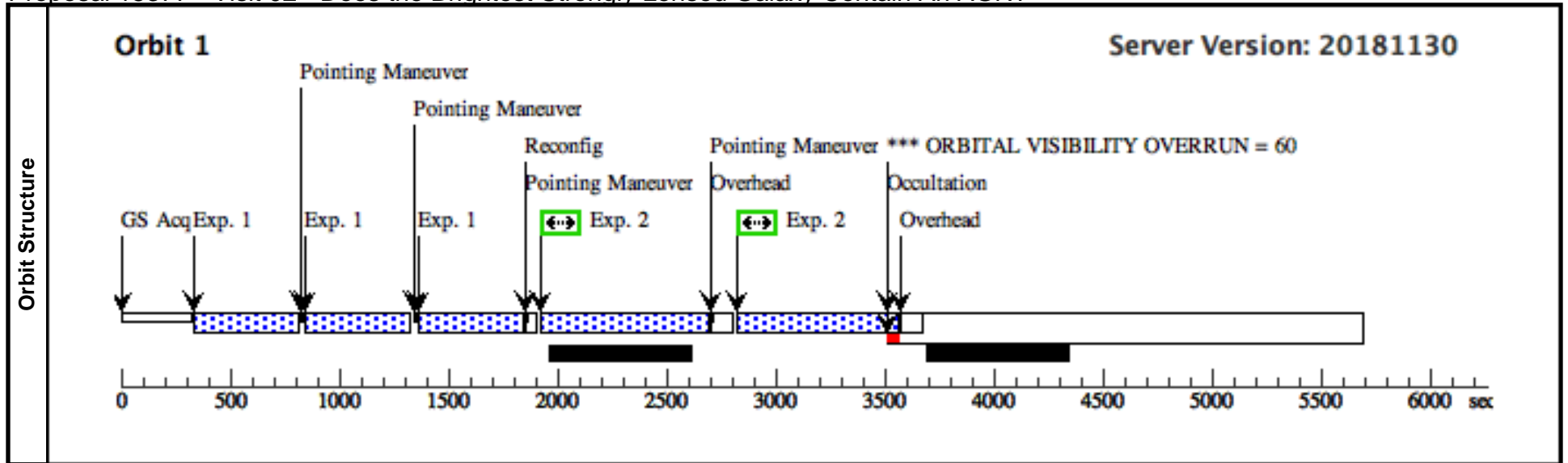
| | | | | | | | | | | |
|----------------------|--|---|---|---------------------------------|---|-----------------------------------|----------------------|--|--|--------------|
| Visit | Proposal 15377, Visit 01, completed Diagnostic Status: Warning Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none) | | | | | | | | | |
| | (Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN | | | | | | | | | |
| Diagnosics | | | | | | | | | | |
| | | | | | | | | | | |
| Patterns | # | Primary Pattern | Secondary Pattern | Exposures | | | | | | |
| | (5) | Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false | | (1) | | | | | | |
| (6) | Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false | | (2) | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | (1) | PSZ1-ARC | RA: 15 50 7.0000 (237.5291667d) Dec: -78 11 32.00 (-78.19222d) Equinox: J2000 | | V=17.8 R=17.82, z=17.38, J=16.75, Ks=15.43 (Vega) | Reference Frame: ICRS | | | | |
| | Comments: Category=GALAXY Description=[STARBURST] Extended=YES | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | F160W - Ex p 1 | (1) PSZ1-ARC | WFC3/IR, MULTIACCUM, IR-FIX | F160W | NSAMP=10; SAMP-SEQ=SPAR S50 | POS TARG null,-4 | Pattern 5, Exps 1-1 in Visit 01 (5) | 452.93635 Secs (1358.809 Secs) | |
| | | | | | | | | [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] | [1] | |
| 2 | F606W - Ex p 1 | (1) PSZ1-ARC | WFC3/UVIS, ACCUM, UVIS-CENTER | | F606W | | POS TARG 2,-6 | Pattern 6, Exps 2-2 in Visit 01 (6) | 500 Secs (1484 Secs) | |
| | | | | | | | | [==>742.0 Secs (Pattern 1)] [==>742.0 Secs (Pattern 2)] | [1] | |



Proposal 15377 - Visit 02 - Does the Brightest Strongly Lensed Galaxy Contain An AGN?

Wed Mar 20 13:00:33 GMT 2019

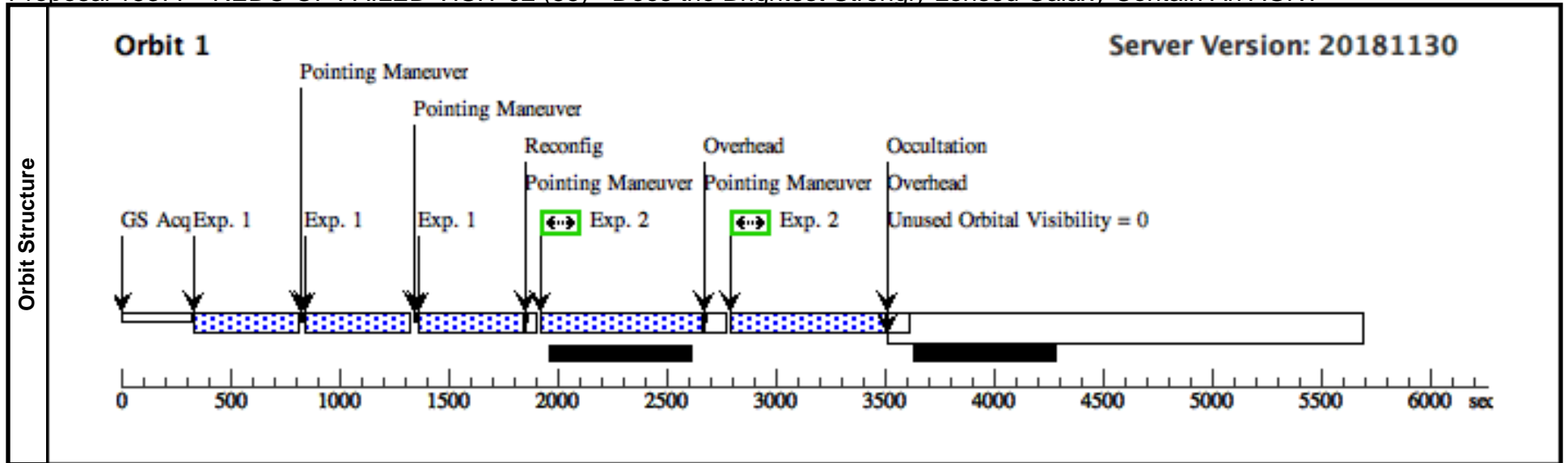
| | | | | | | | | | | |
|---|--|---|---|---------------------------------|---|-----------------------------------|----------------------|---|--|--------------|
| Visit | Proposal 15377, Visit 02, failed Diagnostic Status: Warning Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none) | | | | | | | | | |
| | (Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN | | | | | | | | | |
| Diagnosics | | | | | | | | | | |
| | | | | | | | | | | |
| Patterns | # | Primary Pattern | Secondary Pattern | Exposures | | | | | | |
| | (5) | Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false | | (1) | | | | | | |
| (6) | Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false | | (2) | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | (1) | PSZ1-ARC | RA: 15 50 7.0000 (237.5291667d) Dec: -78 11 32.00 (-78.19222d) Equinox: J2000 | | V=17.8 R=17.82, z=17.38, J=16.75, Ks=15.43 (Vega) | Reference Frame: ICRS | | | | |
| Comments: Category=GALAXY Description=[STARBURST] Extended=YES | | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | F160W - Ex p 1 | (1) PSZ1-ARC | WFC3/IR, MULTIACCUM, IR-FIX | F125W | NSAMP=10; SAMP-SEQ=SPAR S50 | POS TARG null,-4 | Pattern 5, Exps 1-1 i n Visit 02 (5) | 452.93635 Secs (1358.809 Secs) | |
| | | | | | | | | | [==>(Pattern 1)] | |
| | | | | | | | | | [==>(Pattern 2)] | [1] |
| | | | | | | | | | [==>(Pattern 3)] | |
| 2 | F606W - Ex p 1 | (1) PSZ1-ARC | WFC3/UVIS, ACCUM, UVIS-CENTER | | F606W | | POS TARG 2,-4 | Pattern 6, Exps 2-2 i n Visit 02 (6) | 500 Secs (1484 Secs) | |
| | | | | | | | | | [==>742.0 Secs (Pattern 1)] | |
| | | | | | | | | | [==>742.0 Secs (Pattern 2)] | [1] |



Proposal 15377 - REDO OF FAILED VISIT 02 (55) - Does the Brightest Strongly Lensed Galaxy Contain An AGN?

Wed Mar 20 13:00:33 GMT 2019

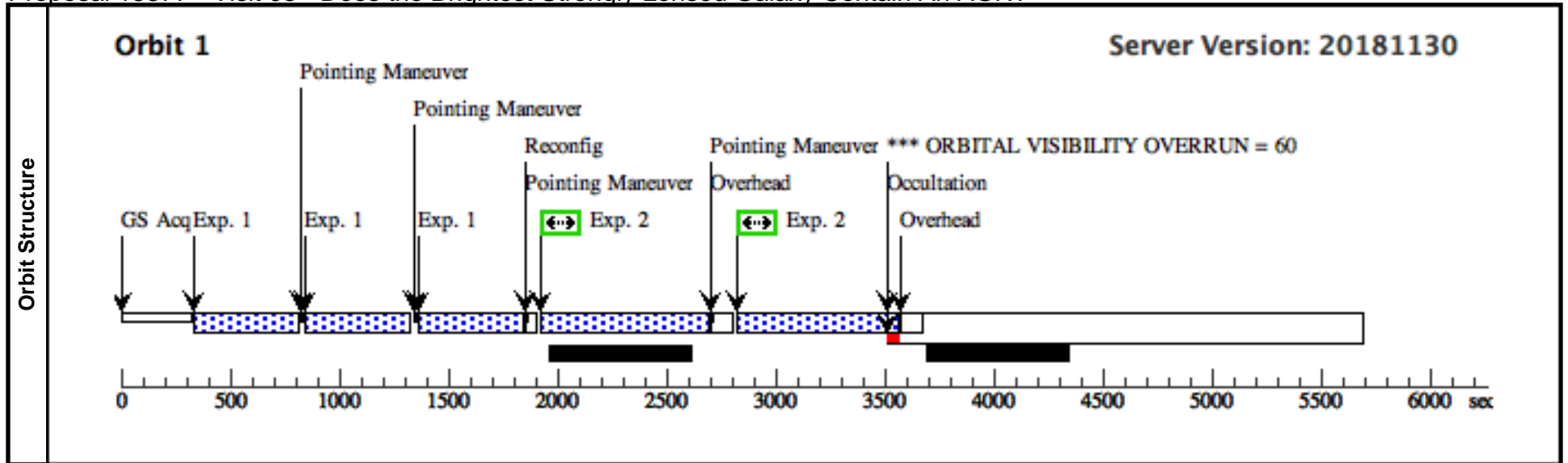
| Visit | Proposal 15377, REDO OF FAILED VISIT 02 (55) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none) | | | | | | | | | |
|--|---|---|---|-----------------------------|---|-----------------------------------|---|--|--|-------|
| | # | Primary Pattern | Secondary Pattern | Exposures | | | | | | |
| Patterns | (5) | Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false | | (1) | | | | | | |
| | (6) | Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false | | (2) | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | (1) | PSZ1-ARC | RA: 15 50 7.0000 (237.5291667d) Dec: -78 11 32.00 (-78.19222d) Equinox: J2000 | | V=17.8 R=17.82, z=17.38, J=16.75, Ks=15.43 (Vega) | Reference Frame: ICRS | | | | |
| <i>Comments:</i> Category=GALAXY Description=[STARBURST] Extended=YES | | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | F160W - Ex p 1 | (1) PSZ1-ARC | WFC3/IR, MULTIACCUM, IR-FIX | F125W | NSAMP=10; SAMP-SEQ=SPAR S50 | POS TARG null,-4 | Pattern 5, Exps 1-1 in REDO OF FAILED VISIT 02 (55) (5) | 452.93635 Secs (1358.809 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] | [1] |
| 2 | F606W - Ex p 1 | (1) PSZ1-ARC | WFC3/UVIS, ACCUM, UVIS-CENTER | F606W | | POS TARG 2,-4 | Pattern 6, Exps 2-2 in REDO OF FAILED VISIT 02 (55) (6) | 500 Secs (1424 Secs) [==>712.0 Secs (Pattern 1)] [==>712.0 Secs (Pattern 2)] | [1] | |



Proposal 15377 - Visit 03 - Does the Brightest Strongly Lensed Galaxy Contain An AGN?

Wed Mar 20 13:00:33 GMT 2019

| | | | | | | | | | | |
|---|---|--|---|----------------------------------|---|-----------------------------------|----------------------|---|--|--------------|
| Visit | Proposal 15377, Visit 03, completed Diagnostic Status: Warning Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: (none) | | | | | | | | | |
| | (Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN | | | | | | | | | |
| Diagnos | | | | | | | | | | |
| | | | | | | | | | | |
| Patterns | # | Primary Pattern | Secondary Pattern | Exposures | | | | | | |
| | (5) | Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= | Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false | | (1) | | | | | |
| Patterns | (6) | Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= | Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false | | (2) | | | | | |
| | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | (1) | PSZ1-ARC | RA: 15 50 7.0000 (237.5291667d) Dec: -78 11 32.00 (-78.19222d) Equinox: J2000 | | V=17.8 R=17.82, z=17.38, J=16.75, Ks=15.43 (Vega) | Reference Frame: ICRS | | | | |
| Comments: Category=GALAXY Description=[STARBURST] Extended=YES | | | | | | | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | F160W - Ex p 1 | (1) PSZ1-ARC | WFC3/IR, MULTIACCUM, IR-FIX | F098M | NSAMP=10; SAMP-SEQ=SPAR S50 | POS TARG null,-4 | Pattern 5, Exps 1-1 i n Visit 03 (5) | 452.93635 Secs (1358.809 Secs) | |
| | | | | | | | | | [1] | |
| Exposures | 2 | F606W - Ex p 1 | (1) PSZ1-ARC | WFC3/UVIS, ACCUM, UVIS-CENTER | F606W | | POS TARG -2,-4 | Pattern 6, Exps 2-2 i n Visit 03 (6) | 500 Secs (1484 Secs) | |
| | | | | | | | | | | [1] |



Proposal 15377 - Visit 04 - Does the Brightest Strongly Lensed Galaxy Contain An AGN?

Wed Mar 20 13:00:33 GMT 2019

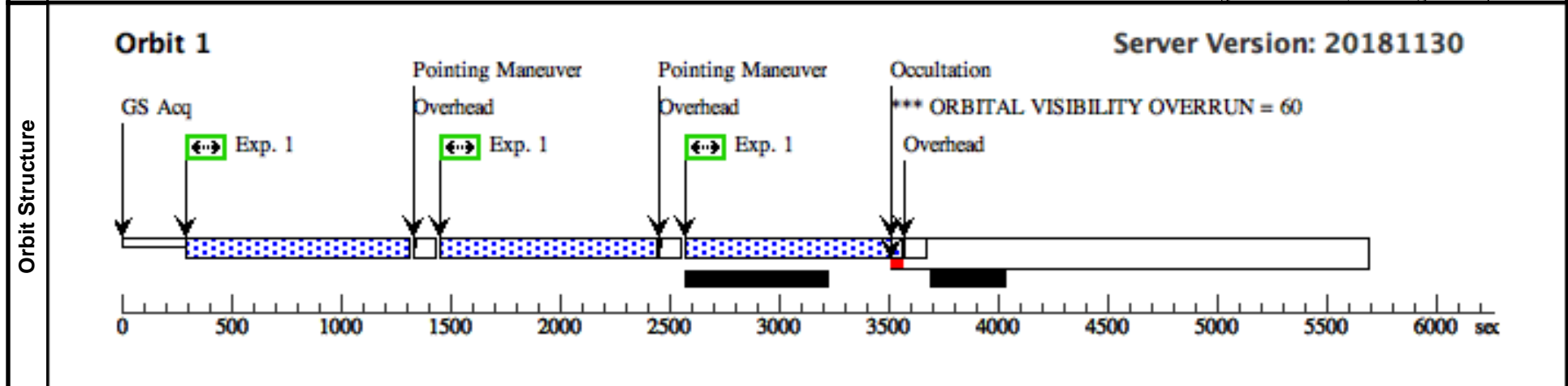
| | |
|--------------|---|
| Visit | Proposal 15377, Visit 04, failed Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: (none) |
| | (Visit 04) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN |

| | |
|-------------------|--|
| Diagnosics | (Visit 04) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN |
| | |

| Patterns | # | Primary Pattern | Secondary Pattern | Exposures |
|-----------------|-----|--|--|-----------|
| | (4) | Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing= | Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false | |

| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|--|-----|----------|---|--------------------------|---|-----------------------|
| | (1) | PSZ1-ARC | RA: 15 50 7.0000 (237.5291667d) Dec: -78 11 32.00 (-78.19222d) Equinox: J2000 | | V=17.8 R=17.82, z=17.38, J=16.75, Ks=15.43 (Vega) | Reference Frame: ICRS |
| <i>Comments:</i> Category=GALAXY Description=[STARBURST] Extended=YES | | | | | | |

| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|------------------|---|----------------|--------------|-------------------------------|---------------|--------------|---------------|---------------|-------------------------------------|---|
| | 1 | F606W - Ex p 1 | (1) PSZ1-ARC | WFC3/UVIS, ACCUM, UVIS-CENTER | F606W | | | POS TARG 0,-4 | Pattern 4, Exps 1-1 in Visit 04 (4) | 700 Secs (2982 Secs) [==>994.0 Secs (Pattern 1)] [==>994.0 Secs (Pattern 2)] [==>994.0 Secs (Pattern 3)] |



Proposal 15377 - Re-do of failed visit 4 (54) - Does the Brightest Strongly Lensed Galaxy Contain An AGN?

Wed Mar 20 13:00:33 GMT 2019

| | | | |
|--------------|---|--|--|
| Visit | Proposal 15377, Re-do of failed visit 4 (54), completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none) | | |
|--------------|---|--|--|

| Patterns | # | Primary Pattern | Secondary Pattern | Exposures |
|-----------------|-----|--|-------------------|-----------|
| | (4) | Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false | | (1) |

| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous |
|----------------------|--|----------|---|--------------------------|---|-----------------------|
| | (1) | PSZ1-ARC | RA: 15 50 7.0000 (237.5291667d) Dec: -78 11 32.00 (-78.19222d) Equinox: J2000 | | V=17.8 R=17.82, z=17.38, J=16.75, Ks=15.43 (Vega) | Reference Frame: ICRS |
| | <i>Comments:</i> Category=GALAXY Description=[STARBURST] Extended=YES | | | | | |

| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
|------------------|---|---------------|--------------|-------------------------------|---------------|--------------|---------------|---|---|-------|
| | 1 | F606W - Exp 1 | (1) PSZ1-ARC | WFC3/UVIS, ACCUM, UVIS-CENTER | F606W | | POS TARG 0,-4 | Pattern 4, Exps 1-1 in Re-do of failed visit 4 (54) (4) | 700 Secs (2922 Secs) [==>974.0 Secs (Pattern 1)] [==>974.0 Secs (Pattern 2)] [==>974.0 Secs (Pattern 3)] | [1] |

