



16680 - The Circumgalactic Medium of a Gas-Rich Ultra Diffuse Galaxy

Cycle: 29, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> | <i>E-Mail</i> |
|--|---------------------------------------|--------------------------------|
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| Dr. Edward B. Jenkins (CoI) | Princeton University | ebj@astro.princeton.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) LBQS1431+0142 | COS/FUV COS/NUV | 4 | 01-Oct-2021 10:01:45.0 | yes |
| 02 | (1) LBQS1431+0142 | COS/FUV COS/NUV | 3 | 01-Oct-2021 10:01:47.0 | yes |

7 Total Orbits Used

ABSTRACT

Ultra Diffuse Galaxies (UDGs) are galaxies with large effective radii but very low surface brightness. They were recently discovered in unprecedented numbers in the Coma Cluster, and are now being found in galaxy groups, and in isolation in the field. Their origin remains far from clear. In this proposal, we request time to observe a QSO that lies behind a gas rich UDG, using the COS G130M grating, in order to search for absorption lines from the interstellar and circumgalactic medium of the galaxy. The sightline to the QSO LBQS 1431+0142 passes within 11 kpc of the UDG ACG 242019, a galaxy with an HI mass of 6×10^8 solar masses, recovered recently in the ALFALFA survey from its 21 cm emission. This

HI mass favors the detection of HI with a high column density in absorption towards the background QSO, which, in combination with metal lines, can be used to measure the metallicity of the CGM gas in the UDG. Such data can help constrain the origin of the galaxy. Comparison of our results with those from the population of Damped Lyman-alpha systems at higher redshift will begin to examine whether UDGs might contribute significantly to the population of QSO Absorption Line Systems in the universe.

OBSERVING DESCRIPTION

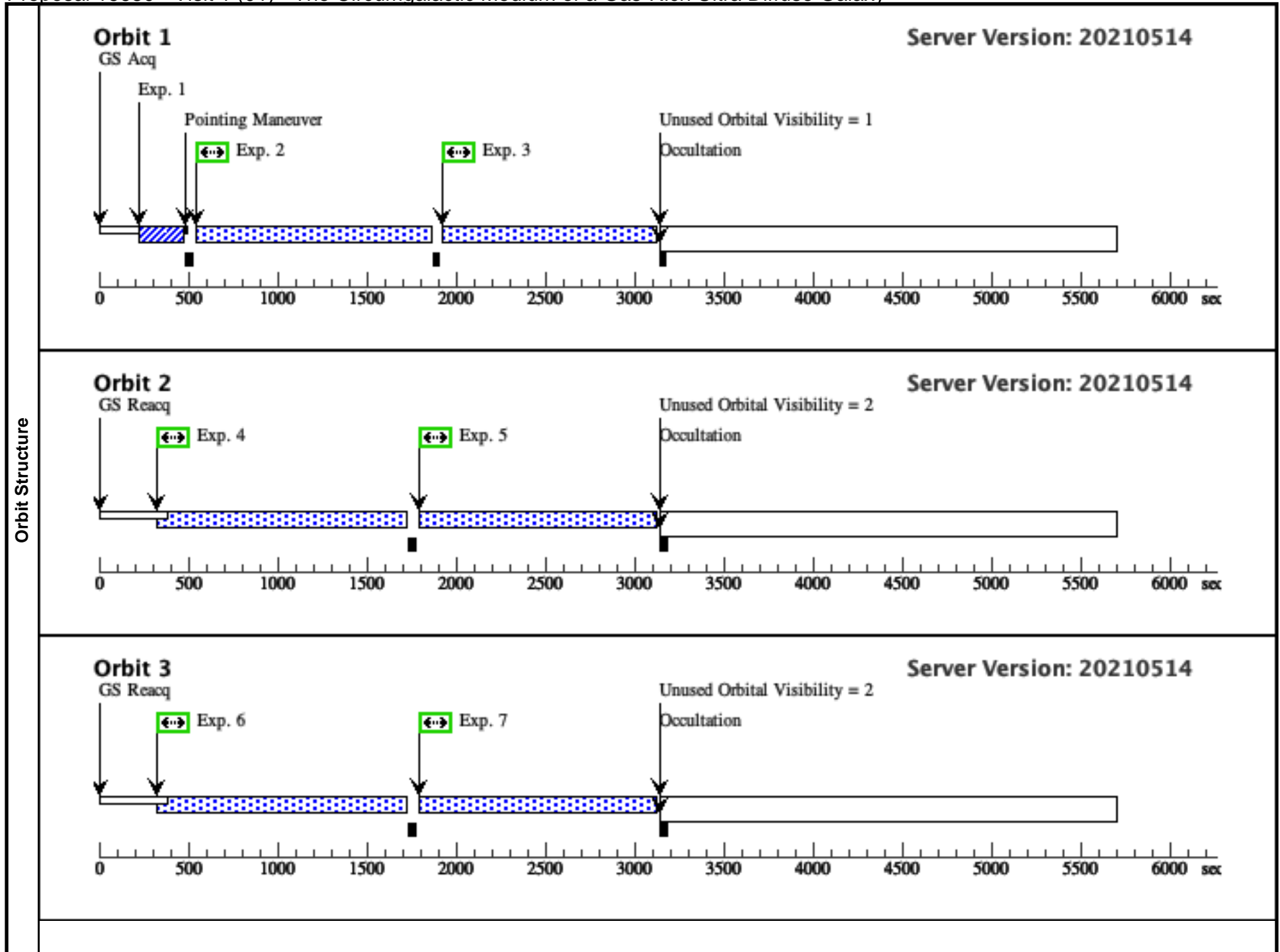
These are G130M observations of a single AGN that lies close to an ultra diffuse galaxy. The most important absorption lines expected from the intervening galaxy are Lyman-alpha and SiIII 1206. As the foreground galaxy is at low redshift, these lines are at wavelengths near geocoronal Lyman-alpha. We therefore need to use the remaining G130M 1291 grating setting to observe them. We utilize the 2 available FP-POS positions to mitigate the effects of large-scale defects. There will be a gap left between 1274-1294Å which can no longer be filled using a different grating setting, but few absorption lines from the intervening galaxy are expected at these wavelengths.

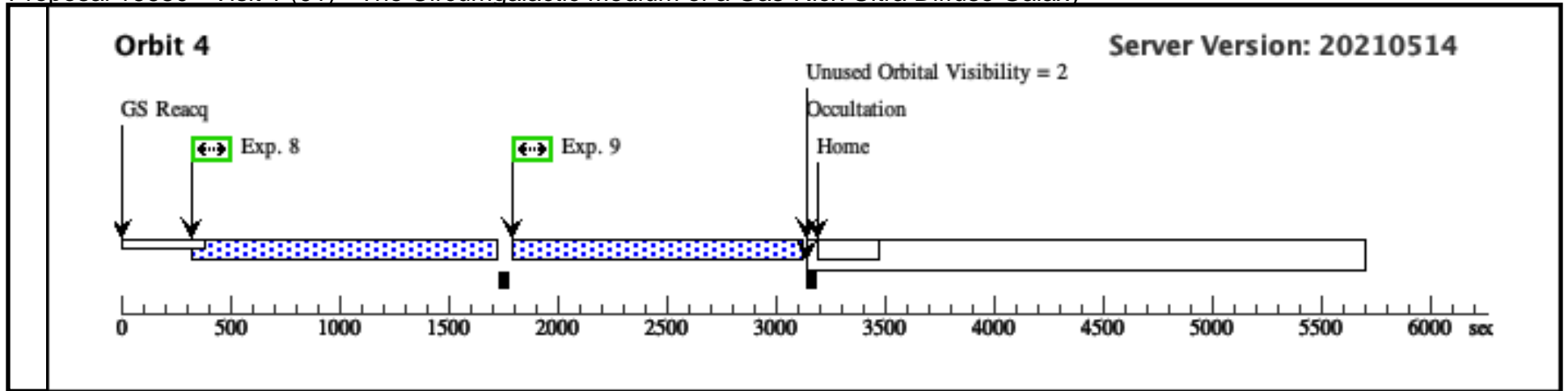
Proposal 16680 - Visit 1 (01) - The Circumgalactic Medium of a Gas-Rich Ultra Diffuse Galaxy

| Visit | Proposal 16680, Visit 1 (01), implementation Fri Oct 01 14:01:47 GMT 2021 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--|--|--------------------|--------------------------|--------------------------|---------------|---------------|-----|---------------|----------------------------------|-----------------|---------|-----------------------|--|---|--|--|-------------------------|--|--|---|--|--|--|--|--|--|--|--|--|
| | Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diagnostics | (Visit 1 (01)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Fixed Targets | <table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>LBQS1431+0142</td> <td>RA: 14 33 48.2100 (218.4508750d)</td> <td>Redshift: 0.211</td> <td>V=18.35</td> <td>Reference Frame: ICRS</td> </tr> <tr> <td></td> <td>Alt Name1: SDSSJ143348.21+01293 7.6</td> <td>Dec: +01 29 37.60 (1.49378d) Equinox: J2000</td> <td></td> <td>GALEX FUV = 33 micro-Jy</td> <td></td> </tr> <tr> <td></td> <td colspan="5"> <i>Comments:</i> Category=GALAXY Description=[QSO] Extended=NO </td> </tr> </tbody> </table> | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | (1) | LBQS1431+0142 | RA: 14 33 48.2100 (218.4508750d) | Redshift: 0.211 | V=18.35 | Reference Frame: ICRS | | Alt Name1: SDSSJ143348.21+01293 7.6 | Dec: +01 29 37.60 (1.49378d) Equinox: J2000 | | GALEX FUV = 33 micro-Jy | | | <i>Comments:</i> Category=GALAXY Description=[QSO] Extended=NO | | | | | | | | | |
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Proposal 16680 - Visit 1 (01) - The Circumgalactic Medium of a Gas-Rich Ultra Diffuse Galaxy

| # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit | |
|-----------|--|--|------------------------|-------------------------|--|--|--------|---------------------------------|--|-----|
| Exposures | 1 | visit 1 - AC Q (COS.ta.152 5176) | (1) LBQS1431+0142 | COS/NUV, ACQ/IMAGE, PSA | MIRRORA | | | 11 Secs (11 Secs) [==>] | [1] | |
| | <i>Comments: Exposure time for a SNR = 20 assuming 50% of GALEX FUV flux</i> | | | | | | | | | |
| | 2 | visit 1 - orbit 1 (COS.sp.152 5177) | (1) LBQS1431+0142 | COS/FUV, TIME-TAG, PSA | G130M 1291 A | FP-POS=3; SEGMENT=BOTH; BUFFER-TIME=56 42 | | | 1086 Secs (1149 Secs) [==>1149.0 Secs] | [1] |
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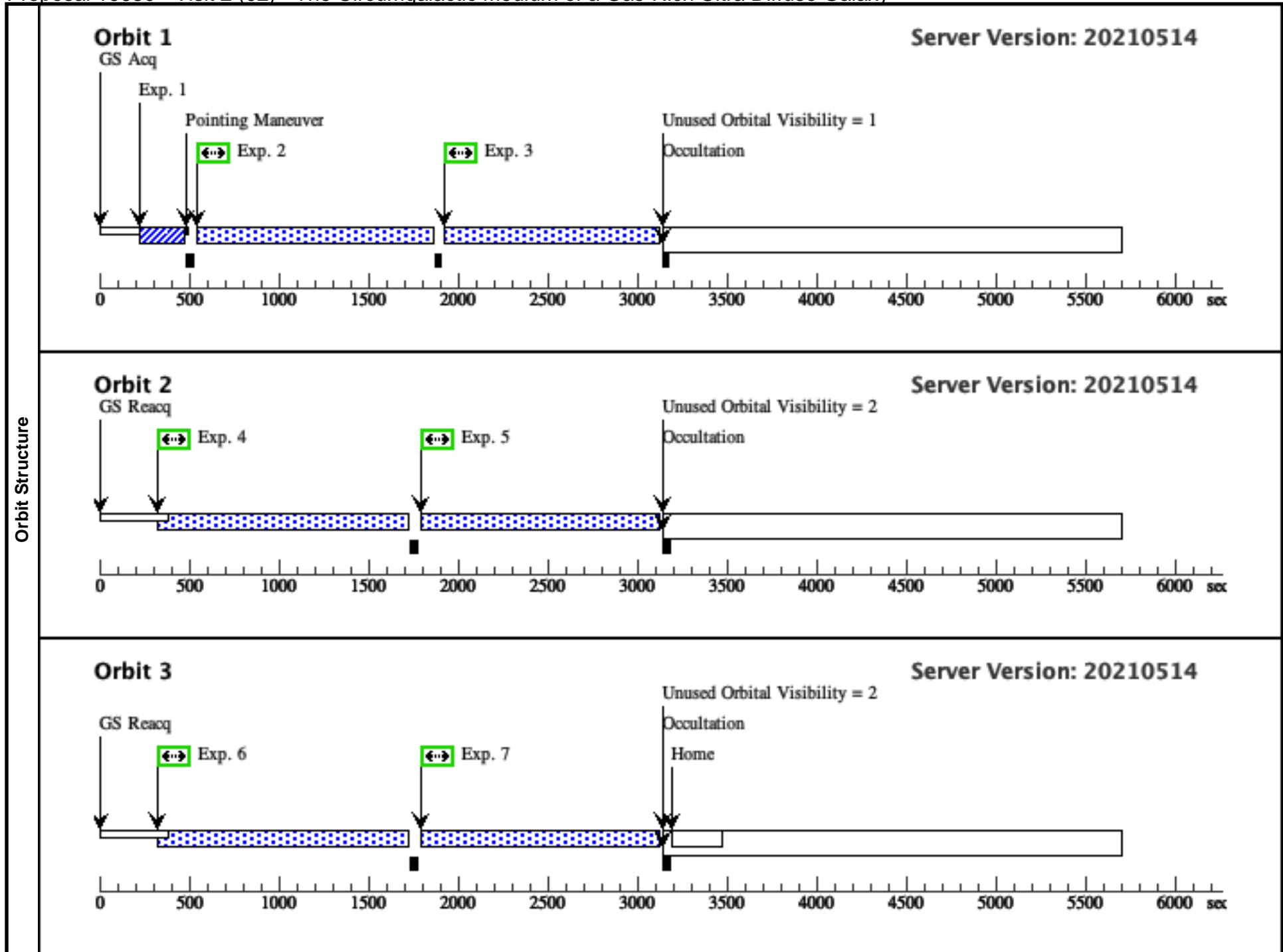




Proposal 16680 - Visit 2 (02) - The Circumgalactic Medium of a Gas-Rich Ultra Diffuse Galaxy

Fri Oct 01 14:01:48 GMT 2021

| Visit | Proposal 16680, Visit 2 (02), implementation Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | (Visit 2 (02)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Visit 2 (02)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diagnosics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Orbit Structure