



# 13813 - Mapping the Broad-band Spectrum of a New Candidate Intermediate Mass Black Hole

Cycle: 22, Proposal Category: GO  
(Availability Mode: SUPPORTED)

## INVESTIGATORS

| <i>Name</i>                               | <i>Institution</i>          | <i>E-Mail</i>                     |
|---|-----------------------------|-----------------------------------|
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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           | (1) L87326-X1                | ACS/SBC                             | 1                  | 11-Aug-2014 21:06:10.0        | yes                           |
| 02           | (1) L87326-X1                | WFC3/IR<br>WFC3/UVIS                | 2                  | 11-Aug-2014 21:06:12.0        | yes                           |

3 Total Orbits Used

## ABSTRACT

We request joint XMM-Newton & HST observations of a new intermediate mass black hole candidate in the galaxy LEDA 87326 to map the broad-band spectral energy distribution from X-ray to near-IR. Previous observations with the XMM-Newton EPIC and OM cameras detected an X-ray source with an observed 0.2-10 keV luminosity of  $6E41$  erg/s, with the X-ray spectrum dominated by a hard power law and the UV/optical data consistent with thermal emission from a cool ( $\sim 0.08$  keV) accretion disc. The high X-ray luminosity and low disc temperature imply a black hole mass  $> 4000$  Msun. By observing this source simultaneously with XMM-Newton and the HST we will confirm that the observed optical emission is from an accretion disc and determine whether any reprocessing in the outer disc is present.

## **OBSERVING DESCRIPTION**

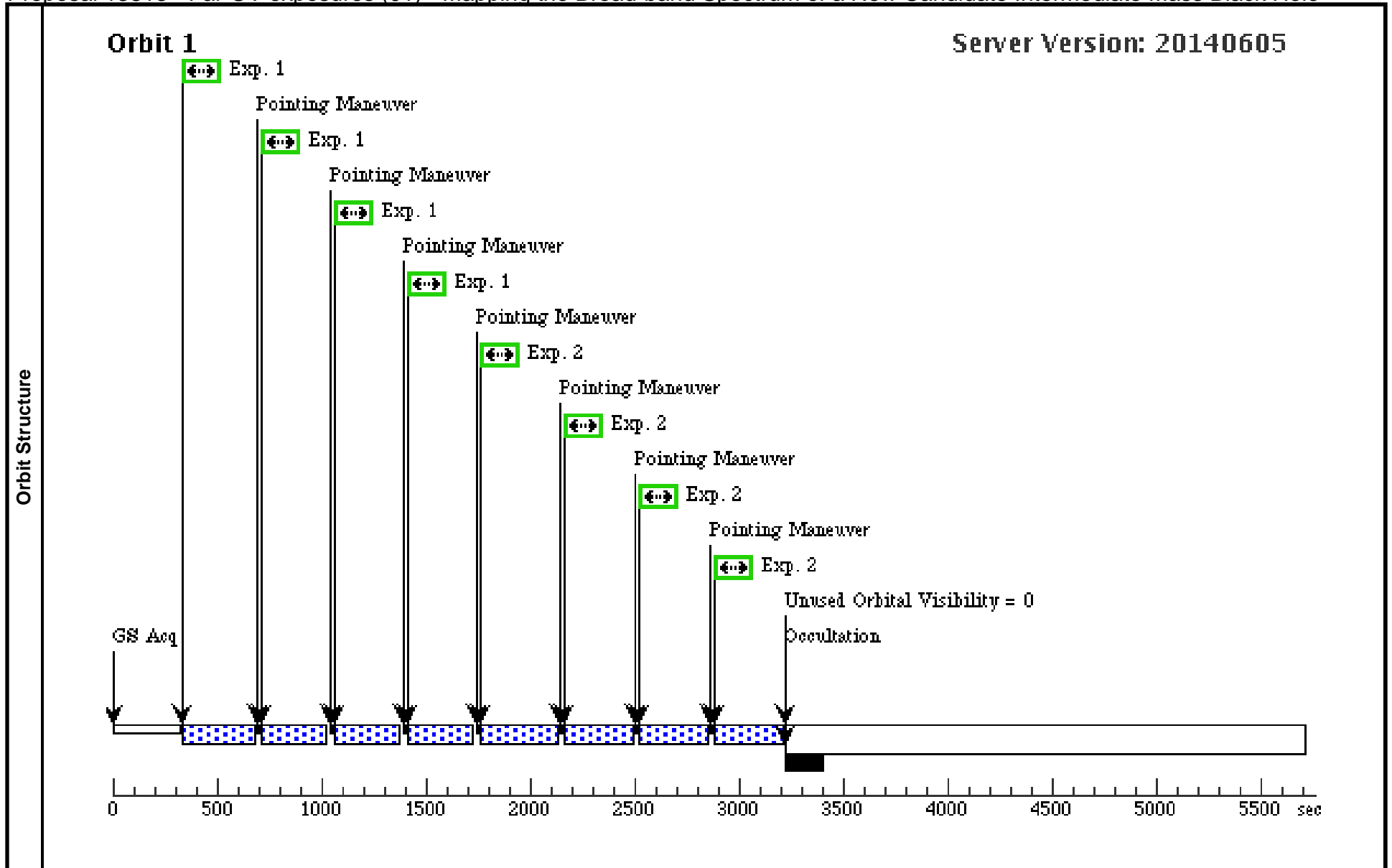
We will observe a new intermediate mass black hole candidate in the galaxy LEDA 87326 simultaneously with XMM-Newton and HST to map the broad-band spectral energy distribution from X-ray to near-IR. We will image the target with HST imaging observations totalling 3 orbits with the ACS/SBC in the far-UV (F115LP & F165LP filters), the WFC3/UVIS in the near-UV (F300X filter) and optical g (F475W filter), and the WFC3/IR in the near-IR H (F160W filters) bands.

We request that the XMM-Newton and HST observations take place within +/- 7 days of each other if possible. We have split the HST observations into two visits (one containing all the ACS/SBC exposures and the other the WFC3 UVIS/IR exposures) to aid in schedulability of the program. Our exposure times were dictated by the overheads for each exposure rather than exposure times necessary to obtain sufficient S/N. As such, a reduction in the orbital visibility period for each orbit would not negatively impact our program, so long as each exposure (if trimmed down to the overhead value) still fits within the specified orbit.

Proposal 13813 - Far-UV exposures (01) - Mapping the Broad-band Spectrum of a New Candidate Intermediate Mass Black Hole

Tue Aug 12 01:06:14 GMT 2014

|                      |   |  |   |                             |                                 |                          |   |  |  |     |              |
|----------------------|---|--|---|-----------------------------|---------------------------------|--------------------------|---|--|--|-----|--------------|
| <b>Visit</b>         | <b>Proposal 13813, Far-UV exposures (01), implementation</b><br><b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: ACS/SBC<br>Special Requirements: GROUP 01,02 WITHIN 7D<br>Comments: F115LP and F165LP exposures in the far UV using the ACS/SBC.<br>To be coordinated with XMM-Newton observations (preferably to take place within 7 days of the XMM exposures). |  |   |                             |                                 |                          |   |  |  |     |              |
|                      | <b>Patterns</b>   | <b>#</b>   | <b>Primary Pattern</b>  |                             |                                 | <b>Secondary Pattern</b> |   |  | <b>Exposures</b>   |     |              |
| (1)                  |   | Pattern Type=ACS-SBC-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.179<br>Line Spacing=0.116 | Coordinate Frame=POS-TARG<br>Pattern Orientation=20.02<br>Angle Between Sides=63.65<br>Center Pattern=false |                             |                                 |                          |   |  | (1), (2)   |     |              |
| <b>Fixed Targets</b> | <b>#</b>  | <b>Name</b>  | <b>Target Coordinates</b>   |                             | <b>Targ. Coord. Corrections</b> |                          | <b>Fluxes</b>   |  | <b>Miscellaneous</b>   |     |              |
|                      | (1)   | L87326-X1  | RA: 01 25 58.1000 (21.4920833d)<br>Dec: -01 17 14.80 (-1.28744d)<br>Equinox: J2000                          |                             |                                 |                          | V=21+/-1<br>uvw1 = 22.3 +/- 0.4 mag,<br>B = 22 +/- 0.8 mag,<br>u = 21.7 +/- 0.2 mag,<br>g = 21.9 +/- 0.5 mag,<br>r = 21.6 +/- 0.5 mag,<br>i > 22.6 mag,<br>z > 22 mag | Reference Frame: ICRS  |  |     |              |
| <b>Exposures</b>     | <b>#</b>  | <b>Label (ETC Run)</b>   | <b>Target</b>   | <b>Config,Mode,Aperture</b> | <b>Spectral Els.</b>            | <b>Opt. Params.</b>      | <b>Special Reqs.</b>  | <b>Groups</b>  | <b>Exp. Time (Total)/[Actual Dur.]</b>   |     | <b>Orbit</b> |
|                      | 1   | (ACS.im.53 8116)   | (1) L87326-X1   | ACS/SBC, ACCUM, SBC         | F115LP                          |                          |   | Pattern 1, Exps 1-1 in Far-UV exposures (01) (1)   | 1500 Secs (1145 Secs)  |     |              |
|                      |   |  |   |                             |                                 |                          |   |  | [==>279.5 Secs (Pattern 1)]<br>[==>288.5 Secs (Pattern 2)]<br>[==>288.5 Secs (Pattern 3)]<br>[==>288.5 Secs (Pattern 4)] |     | [1]          |
| 2                    | (ACS.im.53 8117)  | (1) L87326-X1  | ACS/SBC, ACCUM, SBC   | F165LP                      |                                 |                          | Pattern 1, Exps 2-2 in Far-UV exposures (01) (1)  | 1500 Secs (1200 Secs)  |  |     |              |
|                      |   |  |   |                             |                                 |                          |   | [==>300.0 Secs (Pattern 1)]<br>[==>300.0 Secs (Pattern 2)]<br>[==>300.0 Secs (Pattern 3)]<br>[==>300.0 Secs (Pattern 4)] |  | [1] |              |



Proposal 13813 - Optical/near-IR exposures (02) - Mapping the Broad-band Spectrum of a New Candidate Intermediate Mass Black H...

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| Visit         | Proposal 13813, Optical/near-IR exposures (02), implementation   |  |   |                          |   |                                  |               |   |   |       |
|---------------|--|--|---|--------------------------|---|----------------------------------|---------------|---|---|-------|
|               |  | <b>Diagnostic Status: No Diagnostics</b><br>Scientific Instruments: WFC3/IR, WFC3/UVIS<br>Special Requirements: GROUP 02,01 WITHIN 7D<br>Comments: F300X, F475W, and F160W exposures in optical/near-IR using the WFC3 UVIS and IR.<br>To be coordinated with XMM-Newton observations (preferably to take place within 7 days of the XMM exposures). |   |                          |   |                                  |               |   |   |       |
| Patterns      | #  | Primary Pattern  | Secondary Pattern   | Exposures                |   |                                  |               |   |   |       |
|               | (2)  | Pattern Type=WFC3-UVIS-DITHER-BOX<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=0.173<br>Line Spacing=0.112   | Coordinate Frame=POS-TARG<br>Pattern Orientation=23.884<br>Angle Between Sides=81.785<br>Center Pattern=false |                          | (1), (2)  |                                  |               |   |   |       |
| (4)           | Pattern Type=WFC3-IR-DITHER-BOX-UVIS<br>Purpose=DITHER<br>Number Of Points=4<br>Point Spacing=23.02<br>Line Spacing=35.212 | Coordinate Frame=POS-TARG<br>Pattern Orientation=0.713<br>Angle Between Sides=89.287<br>Center Pattern=true  |   | (3)                      |   |                                  |               |   |   |       |
| Fixed Targets | #  | Name   | Target Coordinates  | Targ. Coord. Corrections | Fluxes  | Miscellaneous                    |               |   |   |       |
|               | (1)  | L87326-X1  | RA: 01 25 58.1000 (21.4920833d)<br>Dec: -01 17 14.80 (-1.28744d)<br>Equinox: J2000                            |                          | V=21+/-1<br>uvw1 = 22.3 +/- 0.4 mag,<br>B = 22 +/- 0.8 mag,<br>u = 21.7 +/- 0.2 mag,<br>g = 21.9 +/- 0.5 mag,<br>r = 21.6 +/- 0.5 mag,<br>i > 22.6 mag,<br>z > 22 mag | Reference Frame: ICRS            |               |   |   |       |
| Exposures     | #  | Label  | Target  | Config,Mode,Aperture     | Spectral Els.   | Opt. Params.                     | Special Reqs. | Groups  | Exp. Time (Total)/[Actual Dur.]   | Orbit |
|               | 1  | (1) L87326-X1  |   | WFC3/UVIS, ACCUM, UVIS   | F300X   | FLASH=8                          |               | Pattern 2, Exps 1-1 in Optical/near-IR exposures (02) (2) | 1200 Secs (1495 Secs)<br>[==>451.0 Secs (Pattern 1)]<br>[==>348.0 Secs (Pattern 2)]<br>[==>348.0 Secs (Pattern 3)]<br>[==>348.0 Secs (Pattern 4)] | [1]   |
|               | 2  | (1) L87326-X1  |   | WFC3/UVIS, ACCUM, UVIS   | F475W   |                                  |               | Pattern 2, Exps 2-2 in Optical/near-IR exposures (02) (2) | 1200 Secs (1514 Secs)<br>[==>348.0 Secs (Pattern 1)]<br>[==>348.0 Secs (Pattern 2)]<br>[==>466.0 Secs (Pattern 3)]<br>[==>352.0 Secs (Pattern 4)] | [1]   |
|               | 3  | (1) L87326-X1  |   | WFC3/IR, MULTIACCUM, IR  | F160W   | NSAMP=9;<br>SAMP-SEQ=SPAR<br>S50 |               | Pattern 4, Exps 3-3 in Optical/near-IR exposures (02) (4) | 402.935899 Secs (1611.744 Secs)<br>[==>(Pattern 1)]<br>[==>(Pattern 2)]<br>[==>(Pattern 3)]<br>[==>(Pattern 4)]                                   | [2]   |

