



13935 - The Nature of SPIRITS Intermediate-Luminosity Mid-IR Transients

Cycle: 21, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

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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) SPIRITS-14AXA | WFC3/IR WFC3/UVIS | 1 | 05-Sep-2014 21:11:49.0 | 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> |
|--------------|------------------------------|-------------------------------------|--------------------|-------------------------------|-------------------------------|
| 02 | (2) SPIRITS-14AJE | WFC3/IR WFC3/UVIS | 1 | 05-Sep-2014 21:11:50.0 | yes |

2 Total Orbits Used

ABSTRACT

SPIRITS--the SPitzer InfraRed Intensive Transients Survey--is an ongoing search for mid-IR (MIR) variables and transients in nearly 200 nearby galaxies, being carried out with the warm Spitzer telescope at 3.6 and 4.5 microns. It is the first large-scale search for luminous MIR transients in the local universe. Among the many variables that SPIRITS has discovered is a puzzling new class of luminous MIR transients which lack conspicuous optical, or in most cases even near-IR, counterparts in our deepest ground-based followup images. We suggest the name SMIRTs for these objects--Spitzer Mid-IR Transients. The luminosities of SMIRTs exceed those of classical novae, but they are not as bright as any known classes of supernovae. Lying in spiral arms, they appear to be associated with young populations. The properties of SMIRTs are somewhat similar to the recently discovered, but still mysterious, class of intermediate-luminosity red transients, as well as LBVs and "supernova impostors." However, these known types of objects all have bright optical counterparts.

We propose a small program of HST imaging, using the WFC3 IR channel at J and H, and the WFC3 UVIS channel at I, to explore the nature of SMIRTs. We have selected 2 representatives, all in outburst at the time of writing, with a range of eruption timescales. Both have archival pre-explosion HST optical imaging, and one also has archival WFC3/IR. Our aims are: search for faint optical and NIR counterparts while they are still in eruption; extend the SEDs to shorter wavelengths to refine dust temperatures and search for faint photospheres/outflows; and attempt to identify progenitor stars in the archival HST images.

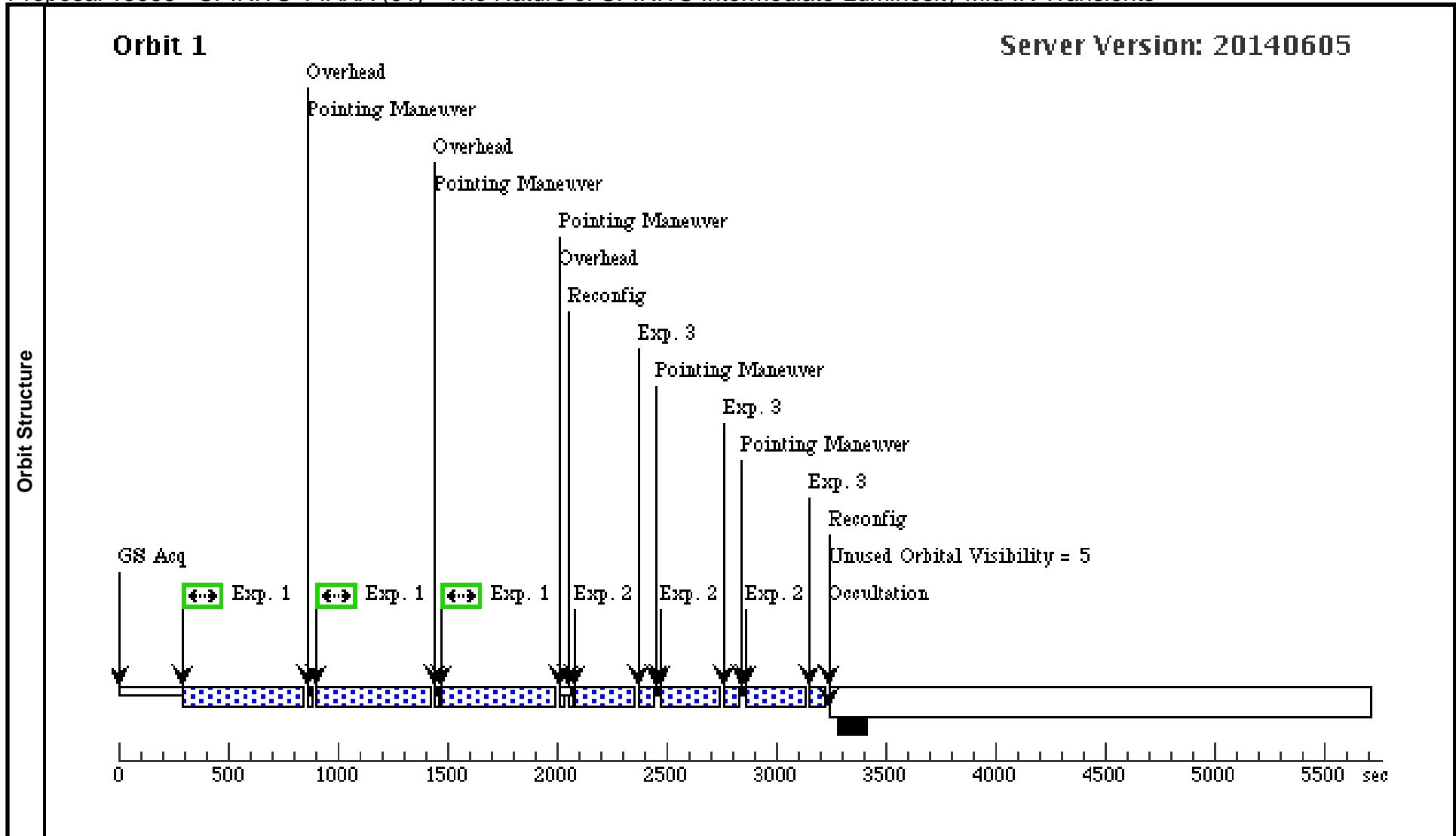
OBSERVING DESCRIPTION

For both of the two targets, we will devote one HST orbit each to imaging with the WFC3 UVIS and IR channels. We will use 3-point dither patterns and the UVIS F814W filter and the IR F110W and F160W filters.

Proposal 13935 - SPIRITS-14AXA (01) - The Nature of SPIRITS Intermediate-Luminosity Mid-IR Transients

Sat Sep 06 01:11:51 GMT 2014

| Visit | Proposal 13935, SPIRITS-14AXA (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: BEFORE 06-OCT-2014:00:00:00: VISIBILITY INTERVAL 54.1 M | | | | | | | | | |
|---------------|--|---|--|-----------------------------------|-------------------------------|--------------------------------|---|--|---|-------|
| | # | Primary Pattern | Secondary Pattern | Exposures | | | | | | |
| Patterns | (1) | 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=true | | (1) | | | | | | |
| | (2) | 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 | | (2-3) | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | (1) | SPIRITS-14AXA | RA: 09 56 1.5200 (149.0063333d) Dec: +69 03 12.40 (69.05344d) Equinox: J2000 | | V=30 | Reference Frame: ICRS | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | (1) SPIRITS-14AXA | (1) SPIRITS-14AXA | WFC3/UVIS, ACCUM, UVIS2-C512C-SUB | F814W | CR-SPLIT=NO | GS ACQ SCENARIO BASE1B3 | Pattern 1, Exps 1-1 in SPIRITS-14AXA (01) (1) | 525 Secs (1575 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] | [1] |
| | 2 | (1) SPIRITS-14AXA | (1) SPIRITS-14AXA | WFC3/IR, MULTIACCUM, IRSUB256 | F110W | NSAMP=12; SAMP-SEQ=SPAR S25 | | Pattern 2, Exps 2-3 in SPIRITS-14AXA (01) (2) | 246.084244 Secs (738.253 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] | [1] |
| 3 | (1) SPIRITS-14AXA | (1) SPIRITS-14AXA | WFC3/IR, MULTIACCUM, IRSUB256 | F160W | NSAMP=9; SAMP-SEQ=SPAR S10 | | Pattern 2, Exps 2-3 in SPIRITS-14AXA (01) (2) | 59.049711 Secs (177.149 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] | [1] | |



Proposal 13935 - SPIRITS-14AJE (02) - The Nature of SPIRITS Intermediate-Luminosity Mid-IR Transients

Sat Sep 06 01:11:52 GMT 2014

| Visit | Proposal 13935, SPIRITS-14AJE (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: BEFORE 06-OCT-2014:00:00:00: VISIBILITY INTERVAL 54 M | | | | | | | | | |
|---------------|--|---|---|--------------------------------------|----------------------------------|-----------------------------------|---|---|---|-------|
| | # | Primary Pattern | Secondary Pattern | Exposures | | | | | | |
| Patterns | (1) | 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=true | | (1) | | | | | | |
| | (2) | 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 | | (2-3) | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | (2) | SPIRITS-14AJE | RA: 14 02 55.5100 (210.7312917d) Dec: +54 23 18.50 (54.38847d) Equinox: J2000 | | V=30 | Reference Frame: ICRS | | | | |
| Exposures | # | Label | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time (Total)/[Actual Dur.] | Orbit |
| | 1 | | (2) SPIRITS-14AJE | WFC3/UVIS, ACCUM, UVIS2-C512C-SUB | F814W | CR-SPLIT=NO | GS ACQ SCENARI O BASE1B3 | Pattern 1, Exps 1-1 i n SPIRITS-14AJE (0 2) (1) | 553 Secs (1659 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] | [1] |
| | 2 | | (2) SPIRITS-14AJE | WFC3/IR, MULTIACCUM, IRSUB256 | F110W | NSAMP=11; SAMP-SEQ=SPAR S25 | | Pattern 2, Exps 2-3 i n SPIRITS-14AJE (0 2) (2) | 223.738205 Secs (671.215 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] | [1] |
| 3 | | (2) SPIRITS-14AJE | WFC3/IR, MULTIACCUM, IRSUB256 | F160W | NSAMP=8; SAMP-SEQ=SPAR S10 | | Pattern 2, Exps 2-3 i n SPIRITS-14AJE (0 2) (2) | 51.703224 Secs (155.11 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] | [1] | |

