



# 13506 - Probing dark matter in the luminous radio galaxy 3C220.3 and the structure of the $z=2.22$ SMG/AGN it is lensing.

Cycle: 21, 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) 3C-220.3                 | WFC3/IR<br>WFC3/UVIS                | 1                  | 03-Oct-2013 22:11:26.0        | yes                           |

1 Total Orbits Used

## ABSTRACT

The radio galaxy 3C 220.3 ( $z=0.685$ ) is lensing a submm galaxy (SMG) at  $z=2.221$  housing an AGN. This unique system allows accurate estimates of both stellar and dark mass in the luminous radio galaxy. In addition, the lensing magnification of 7 offers an unprecedented view of the interaction between star formation and AGN feedback in a luminous, dusty galaxy at the peak epoch of cosmic star formation. Our previous 10ks Chandra observation shows X-ray emission throughout the system, including the SMG, but with too few counts to identify the origin(s). We propose deeper Chandra and HST observations to (1) locate the X-ray sources, measure the X-ray properties and independently estimate the bolometric luminosities of both AGN (2) better map the offset between the SMG's UV and dust emission.

**OBSERVING DESCRIPTION**

3-color imaging of 3C220.3

# Proposal 13506 - 3C220.3 WFC3 (01) - Probing dark matter in the luminous radio galaxy 3C220.3 and the structure of the z=2.22 SM...

|               |                                                                                                                                                                                                                                             |                                                                                                                    |              |                                                                                     |                                                                                                         |                          |                               |                              |                                              |                                                                       |                              |           |          |  |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------|------------------------------|----------------------------------------------|-----------------------------------------------------------------------|------------------------------|-----------|----------|--|
| Visit         | Proposal 13506, 3C220.3 WFC3 (01)                                                                                                                                                                                                           |                                                                                                                    |              |                                                                                     |                                                                                                         |                          |                               |                              |                                              |                                                                       | Fri Oct 04 02:11:35 GMT 2013 |           |          |  |
|               | Diagnostic Status: No Diagnostics                                                                                                                                                                                                           |                                                                                                                    |              |                                                                                     |                                                                                                         |                          |                               |                              |                                              |                                                                       |                              |           |          |  |
|               | Scientific Instruments: WFC3/IR, WFC3/UVIS                                                                                                                                                                                                  |                                                                                                                    |              |                                                                                     |                                                                                                         |                          |                               |                              |                                              |                                                                       |                              |           |          |  |
|               | Special Requirements: SCHED 30%                                                                                                                                                                                                             |                                                                                                                    |              |                                                                                     |                                                                                                         |                          |                               |                              |                                              |                                                                       |                              |           |          |  |
|               | Comments: By using WFC3 for all 3 observations, I was able to get them all into a single orbit.<br>S/N seems fine according to ETC.<br>F814W has time: 1338 instead of planned 1800s, but S/N is still >100 for all 3 pieces of the source. |                                                                                                                    |              |                                                                                     |                                                                                                         |                          |                               |                              |                                              |                                                                       |                              |           |          |  |
| Patterns      | #                                                                                                                                                                                                                                           | Primary Pattern                                                                                                    |              |                                                                                     |                                                                                                         |                          | Secondary Pattern             |                              |                                              |                                                                       |                              | Exposures |          |  |
|               | (2)                                                                                                                                                                                                                                         | Pattern Type=WFC3-IR-DITHER-LINE<br>Purpose=DITHER<br>Number Of Points=2<br>Point Spacing=0.636<br>Line Spacing=   |              |                                                                                     | Coordinate Frame=POS-TARG<br>Pattern Orientation=41.788<br>Angle Between Sides=<br>Center Pattern=false |                          |                               |                              |                                              |                                                                       |                              |           | (3)      |  |
|               | (3)                                                                                                                                                                                                                                         | Pattern Type=WFC3-UVIS-DITHER-LINE<br>Purpose=DITHER<br>Number Of Points=2<br>Point Spacing=0.145<br>Line Spacing= |              |                                                                                     | Coordinate Frame=POS-TARG<br>Pattern Orientation=46.84<br>Angle Between Sides=<br>Center Pattern=false  |                          |                               |                              |                                              |                                                                       |                              |           | (1), (2) |  |
| Fixed Targets | #                                                                                                                                                                                                                                           | Name                                                                                                               |              | Target Coordinates                                                                  |                                                                                                         | Targ. Coord. Corrections |                               | Fluxes                       |                                              | Miscellaneous                                                         |                              |           |          |  |
|               | (1)                                                                                                                                                                                                                                         | 3C-220.3                                                                                                           |              | RA: 09 39 23.8600 (144.8494167d)<br>Dec: +83 15 25.90 (83.25719d)<br>Equinox: J2000 |                                                                                                         | Redshift: 0.685          |                               | V=(?)<br>HST 702W 0.0253 mJy |                                              | Reference Frame: SIMBAD                                               |                              |           |          |  |
|               | Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.<br>Coordinates were updated to align with recent new JVLA data.                                                                           |                                                                                                                    |              |                                                                                     |                                                                                                         |                          |                               |                              |                                              |                                                                       |                              |           |          |  |
| Exposures     | #                                                                                                                                                                                                                                           | Label                                                                                                              | Target       | Config,Mode,Aperture                                                                |                                                                                                         | Spectral Els.            | Opt. Params.                  | Special Reqs.                | Groups                                       | Exp. Time (Total)/[Actual Dur.]                                       |                              | Orbit     |          |  |
|               | 1                                                                                                                                                                                                                                           | WFC3 F814 W                                                                                                        | (1) 3C-220.3 | WFC3/UVIS, ACCUM, UVIS2                                                             |                                                                                                         | F814W                    |                               |                              | Pattern 3, Exps 1-1 in 3C220.3 WFC3 (01) (3) | 669 Secs (1338 Secs)<br>[==>(Pattern 1)]<br>[==>(Pattern 2)]          |                              | [1]       |          |  |
|               | 2                                                                                                                                                                                                                                           | WFC3 F606 W                                                                                                        | (1) 3C-220.3 | WFC3/UVIS, ACCUM, UVIS2                                                             |                                                                                                         | F606W                    |                               |                              | Pattern 3, Exps 2-2 in 3C220.3 WFC3 (01) (3) | 348 Secs (696 Secs)<br>[==>(Pattern 1)]<br>[==>(Pattern 2)]           |                              | [1]       |          |  |
|               | 3                                                                                                                                                                                                                                           | 3C220.3 WF C3 F160W                                                                                                | (1) 3C-220.3 | WFC3/IR, MULTIACCUM, IR                                                             |                                                                                                         | F160W                    | SAMP-SEQ=SPARS 50;<br>NSAMP=7 |                              | Pattern 2, Exps 3-3 in 3C220.3 WFC3 (01) (2) | 302.934997 Secs (605.87 Secs)<br>[==>(Pattern 1)]<br>[==>(Pattern 2)] |                              | [1]       |          |  |

