



12585 - A Deep, High Resolution NIRCcam Mosaic of Cas A: Keeping Up with its Rapidly Evolving Structure

Cycle: 5, Proposal Category: GO

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> |
|--|--|
| Dr. Robert A. Fesen (PI) | Dartmouth College |
| Dr. Dan Milisavljevic (CoI) (CoPI) | Purdue University |
| Dr. Salvatore Orlando (CoI) (ESA Member) | INAF - Osservatorio Astronomico di Palermo |
| Prof. Bon-Chul Koo (CoI) | Seoul National University |
| Dr. Tea Temim (CoI) | Princeton University |

OBSERVATIONS

| <i>Folder</i> | <i>Observation</i> | <i>Label</i> | <i>Observing Template</i> | <i>Science Target</i> |
|--------------------|--------------------|------------------------|---------------------------|-----------------------|
| Observation Folder | | | | |
| | 2 | NIRCcam mosaic Cycle 5 | NIRCcam Imaging | (1) Cas-A |

ABSTRACT

The Galactic supernova remnant Cassiopeia A (Cas A) is the youngest Galactic core-collapse SNR known and, at an estimated distance of 3.4 kpc provides us with the clearest look at the properties and explosion dynamics of a high mass supernova. Cas A's ejecta knots are typically sub-arcseconds in size and can show emission and morphological changes on timescales from a few months to a few years. No other remnant, with the exception of SN 1987A, shows such rapid optical changes across large portions of its structure.

We propose a deep NIRCcam image of Cas A remnant in Cycles 4 and 5 using a filter especially sensitive to the remnant's bright emission lines to match existing WFC2 and ACS HST images but with a resolution 3-4 times better. Three other NIRCcam filters will be used to match those taken in

JWST's Cycle 1. These data will extend and complement the existing HST/JWST images and be an HST-JWST transition for the study and MHD modeling of Cas A and other high mass, core-collapse SNe.

OBSERVING DESCRIPTION

This program will reproduce NIRCcam mosaics obtained in Cycle 1 through program ID 1947 (PI: Milisavljevic). In addition to the three original filters F162M, F356W, and F444W, we also include the F070W that will broadly match the bandpass of existing HST/WFC F625W+F775W images. A repeat of the mosaics will be conducted in Cycle 5. These observations will be analyzed for clump sizes and compared to existing data to measure proper motion. We request that these new observations broadly match the orient of the original Cycle 1 observations to maximize overlap of the data sets.

Proposal 12585 - Targets - A Deep, High Resolution NIRCam Mosaic of Cas A: Keeping Up with its Rapidly Evolving Structure

| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|--|-----|-------|---|--------------------------|---------------|
| | (1) | Cas-A | RA: 23 23 24.0000 (350.8500000d) Dec: +58 48 54.00 (58.81500d) Equinox: J2000 | Epoch of Position: 2000 | |
| <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=ISM</i> <i>Description=[Supernova remnants]</i> | | | | | |

Proposal 12585 - Observation 2 - A Deep, High Resolution NIRCcam Mosaic of Cas A: Keeping Up with its Rapidly Evolving Structure

Tue Apr 07 21:00:15 GMT 2026

| | | | | | | | | | | |
|--------------------------|--|----------------------------|---|------------------------------------|------------------------|---------------------------|---------------------------|----------------------|----------------------------|------------------------|
| Observation | Proposal 12585, Observation 2: NIRCcam mosaic Cycle 5 Diagnostic Status: Warning Observing Template: NIRCcam Imaging | | | | | | | | | |
| | (NIRCcam mosaic Cycle 5 (Obs 2)) Warning (Form): By selecting Target Placement = Module Gap the target coordinates will not fall on any detector unless an appropriate Mosaic, set of Dithers or Offset Special Requirement is specified. (Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:2) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:3) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:4) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:5) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:6) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:7) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:8) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:9) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:10) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:11) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 2:12) Warning (Form): Overheads are provisional until the Visit Planner has been run. | | | | | | | | | |
| Diagnostics | | | | | | | | | | |
| | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | | | Miscellaneous | | | |
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| Template | Module | Subarray | | Target Placement | | | | | | |
| | ALL | FULL | | Module gap (large extended source) | | | | | | |
| Mosaic | Rows | Columns | Row Overlap % | Column Overlap % | Row shift (deg) | Column shift (deg) | Tile Order | | | |
| | 3 | 1 | 10.0 | 10.0 | 0.0 | 0.0 | DEFAULT | | | |
| Dithers | # | Primary Dither Type | Primary Dithers | Subpixel Dither Type | Dither Size | Subpixel Positions | | | | |
| | 1 | FULL | 3TIGHT | SMALL-GRID-DITHER | | 4 | | | | |
| Spectral Elements | # | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | Optional ETC ID |
| | 1 | F070W | F356W | BRIGHT1 | 7 | 1 | 12 | 12 | 1674.936 | |
| | 2 | F162M+F150W2 | F444W | BRIGHT1 | 7 | 1 | 12 | 12 | 1674.936 | |

Proposal 12585 - Observation 2 - A Deep, High Resolution NIRCcam Mosaic of Cas A: Keeping Up with its Rapidly Evolving Structure

Special Requirements

Sequence Visits within 53.0 Days
Aperture PA Range 109.92542306 to 129.92542306 Degrees (V3 110.0 to 130.0)
Visits Same PA