



WFIRST Science Operations at the Space Telescope Science Institute

Karoline Gilbert and the STScI WFIRST Team

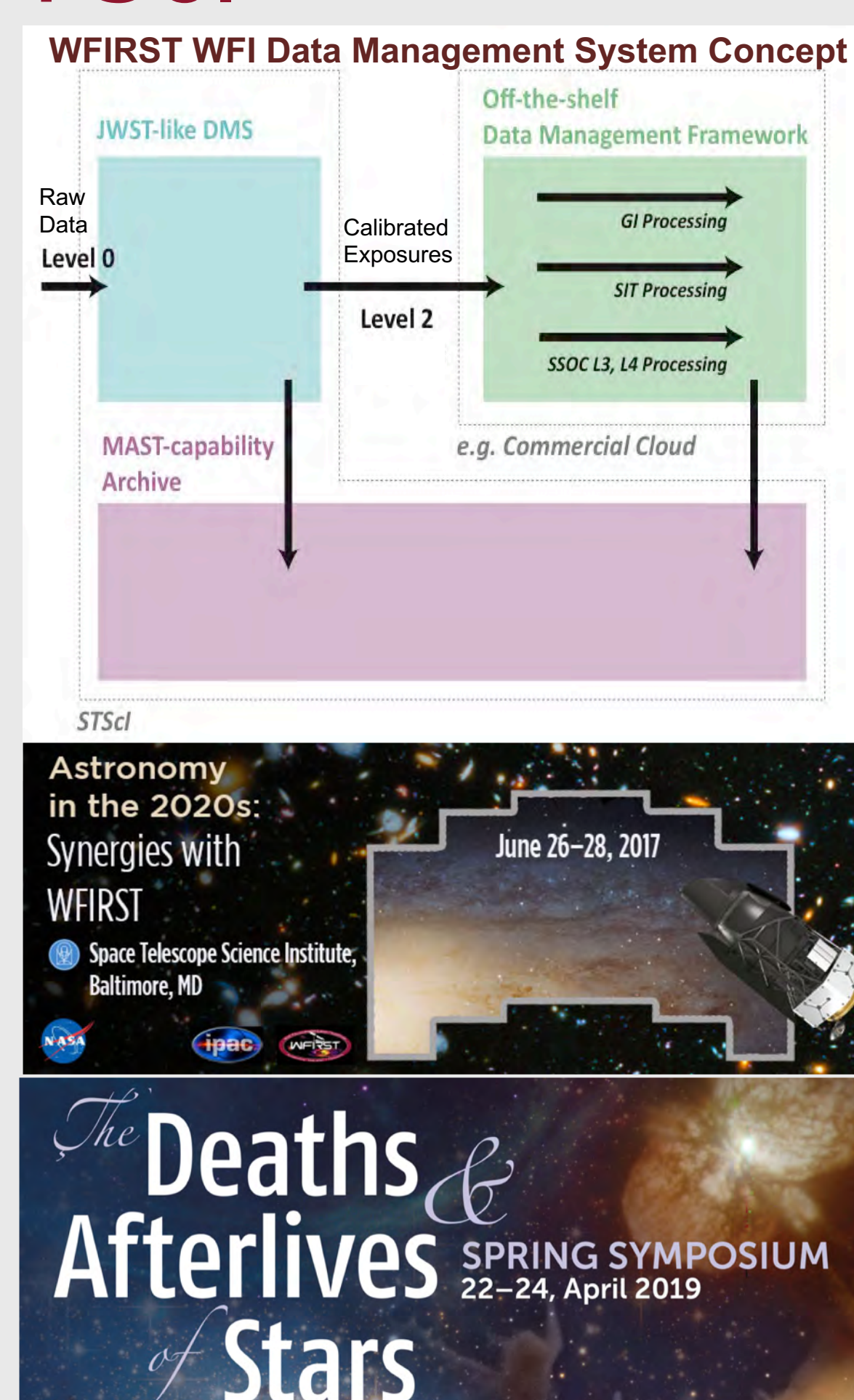
The WFIRST Mission at STScI

The Wide Field Instrument (WFI) on WFIRST will be a powerful survey instrument, combining comparable sensitivity and resolution to the Hubble Space Telescope but with a field of view 100 times larger. STScI will be the Science Operations Center (SOC) for the WFIRST Mission, with additional science support provided by IPAC and foreign partners. STScI will schedule and archive all WFIRST observations (WFI and Coronagraph), calibrate and produce pipeline-reduced data products for imaging with the Wide Field Instrument, support the High Latitude Imaging and Supernova Survey Teams, and support the astronomical community in planning WFI imaging observations and analyzing the data. During the design phase of the WFIRST Mission, STScI is building on detailed concepts for WFIRST operations produced in the formulation phase. These include a data management system that will incorporate a cloud-based framework for high-level data processing. This will provide a common environment accessible to STScI operations, Survey Teams, General Observers, and archival investigators. STScI will also continue the development of simulation tools to aid the astronomical community in examining the capabilities of the WFI. These tools include a point spread function simulator, an exposure time calculator, and an image simulator, and are publicly available.

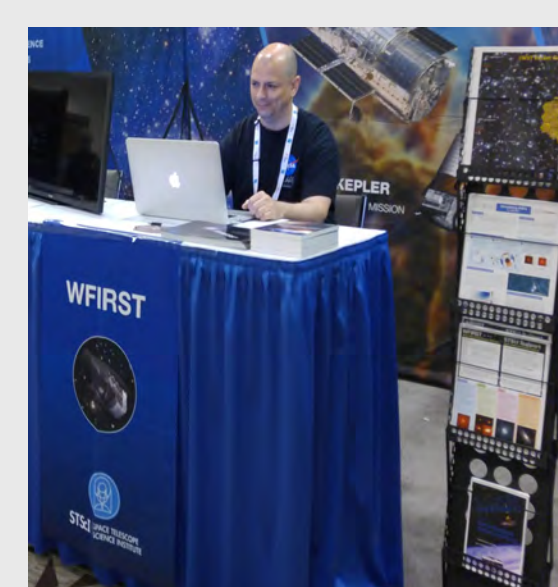
WFIRST Science Operations at STScI

- Planning and scheduling of all WFIRST observations
- Archiving of all WFIRST observations
- Planning tools for WFI observation specifications
- An integrated data management system for data processing and the archive:
 - Data processing of WFI imaging data based on existing JWST pipeline and Survey Team components
 - A common environment for high-level data processing accessible to all users via a portable, cloud-based data management framework
 - Archive with MAST-like capability and interfaces
- WFI Community Engagement and Public Outreach

A full list of STScI workshops relevant to WFIRST is available on our News & Events page at <https://www.stsci.edu/wfirst>
View the talks in the video archive accessible from <https://webcast.stsci.edu>



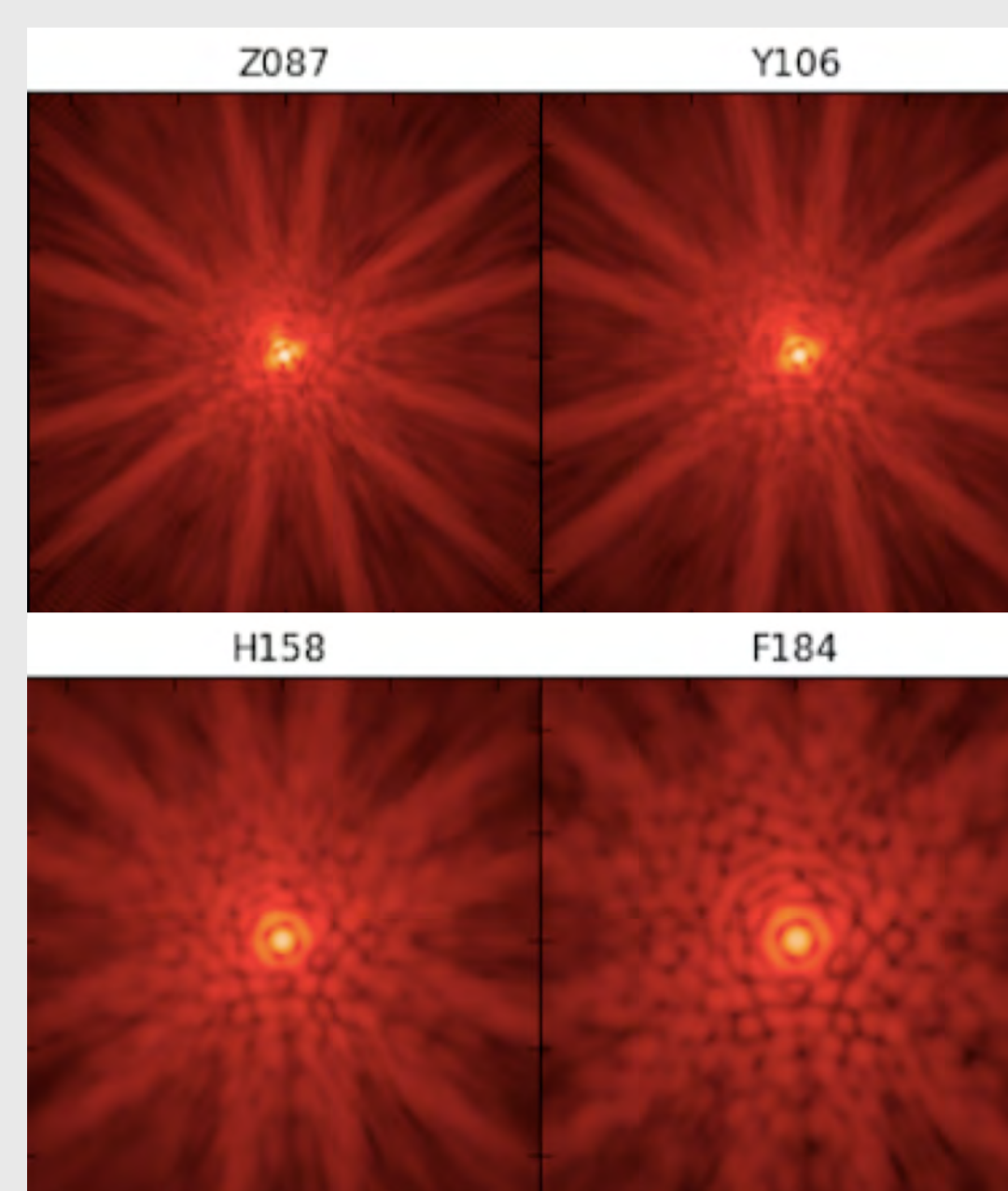
For more information about WFIRST at STScI, visit us at the STScI booth. Or visit us on-line, where you'll find general information, detailed descriptions of the simulation tools described above, as well as technical reports and engagement materials: <https://www.stsci.edu/wfirst>



WFI Simulation Tools

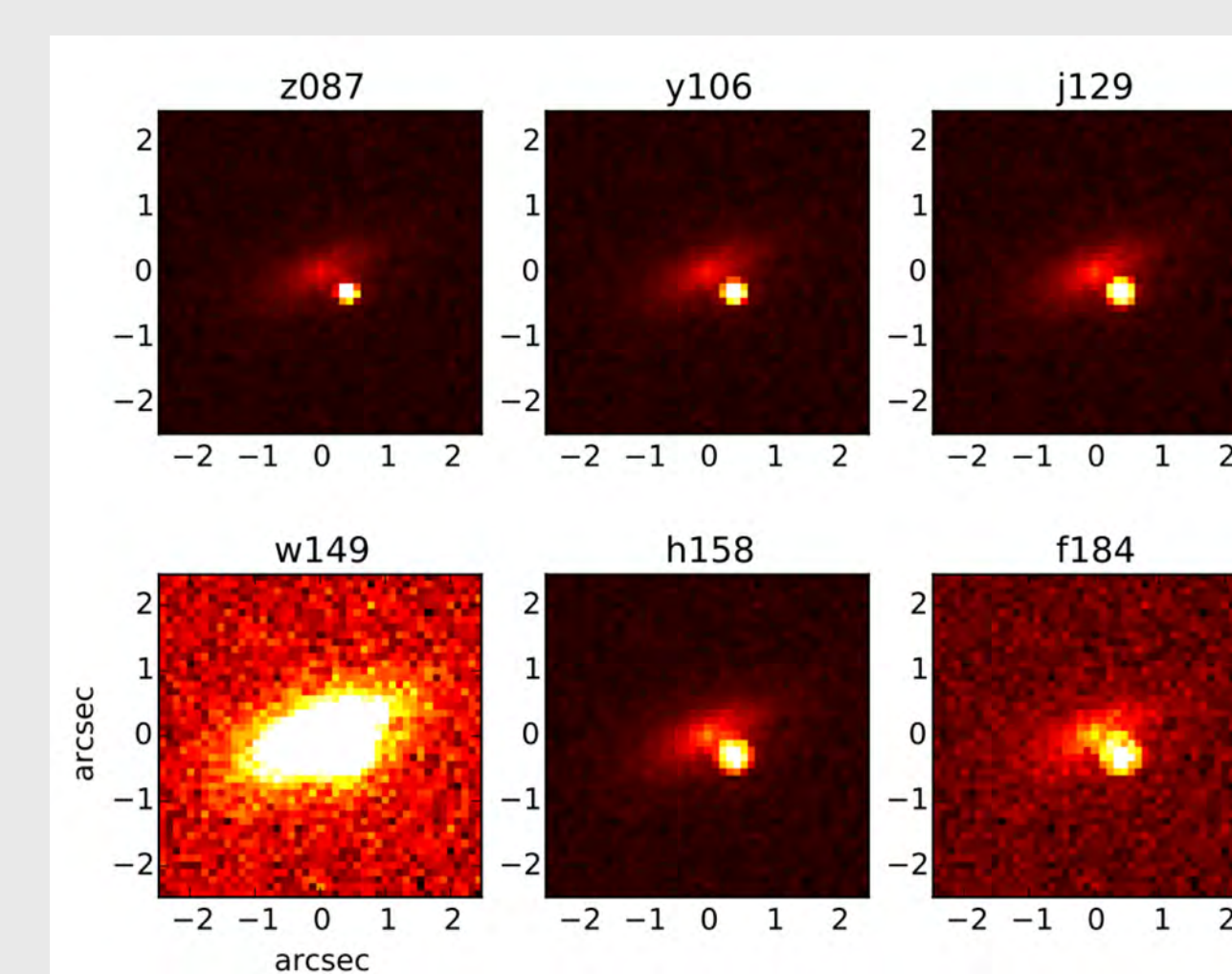
STScI has built upon a suite of tools developed for the JWST mission to enable the astronomical community to investigate the scientific capabilities of WFIRST. STScI will continue to expand the functionality and fidelity of these tools to enable robust survey and GO planning both before and during WFIRST operations. Overview documentation of the functionality of the WFIRST implementations of the tools can be found in the Science Planning Toolbox at <https://www.stsci.edu/wfirst>.

WebbPSF: Point Spread Functions



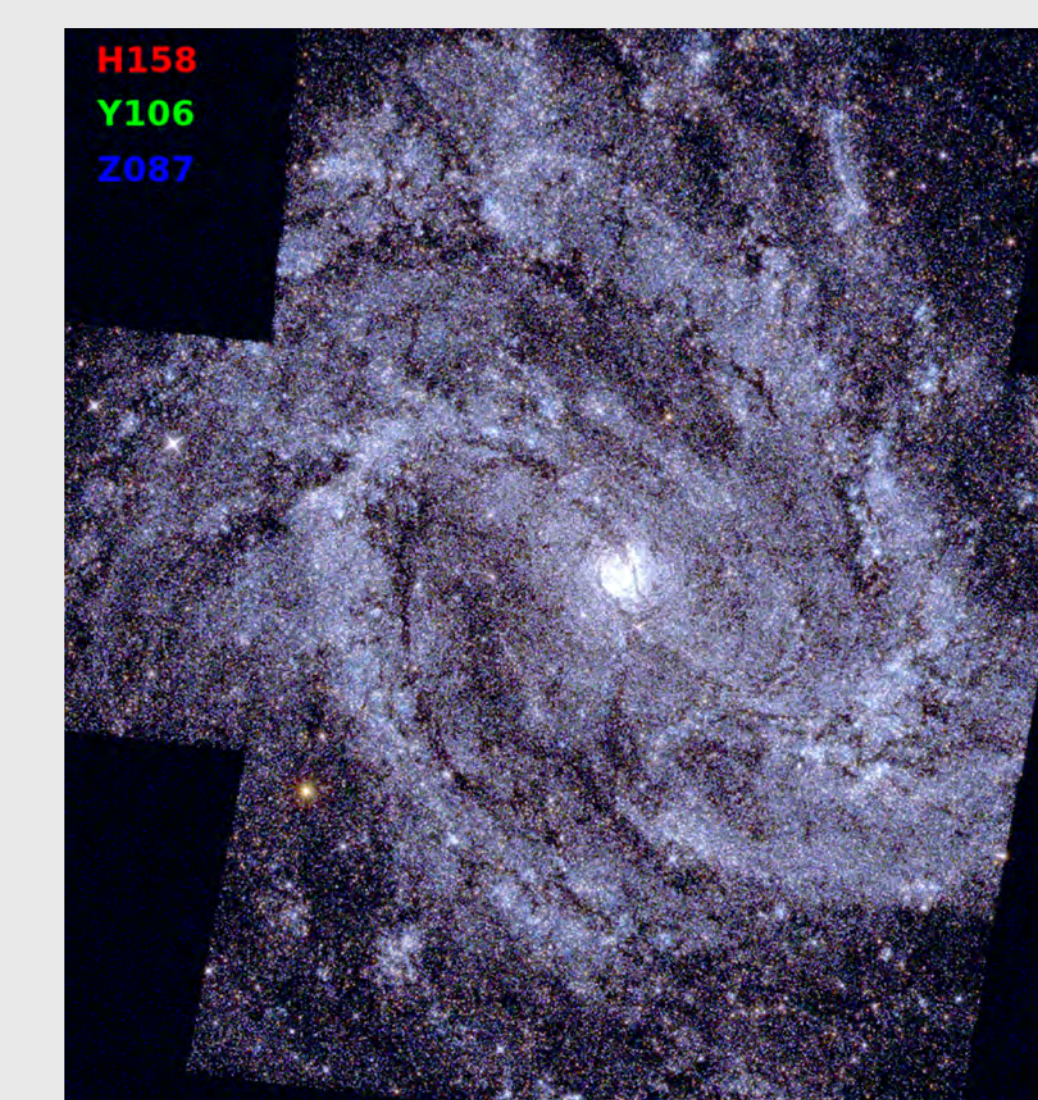
The WFIRST implementation of WebbPSF calculates high-fidelity point-spread function (PSF) models, providing PSFs for use in other tools and for precursor science planning.

Pandaia: Exposure Time Calculator



Pandaia calculates data cubes (x, y, lambda) for astronomical sources and small scenes, which are processed through instrument models to generate simulated data, enabling accurate signal-to-noise ratio and exposure time calculations for WFIRST observations.

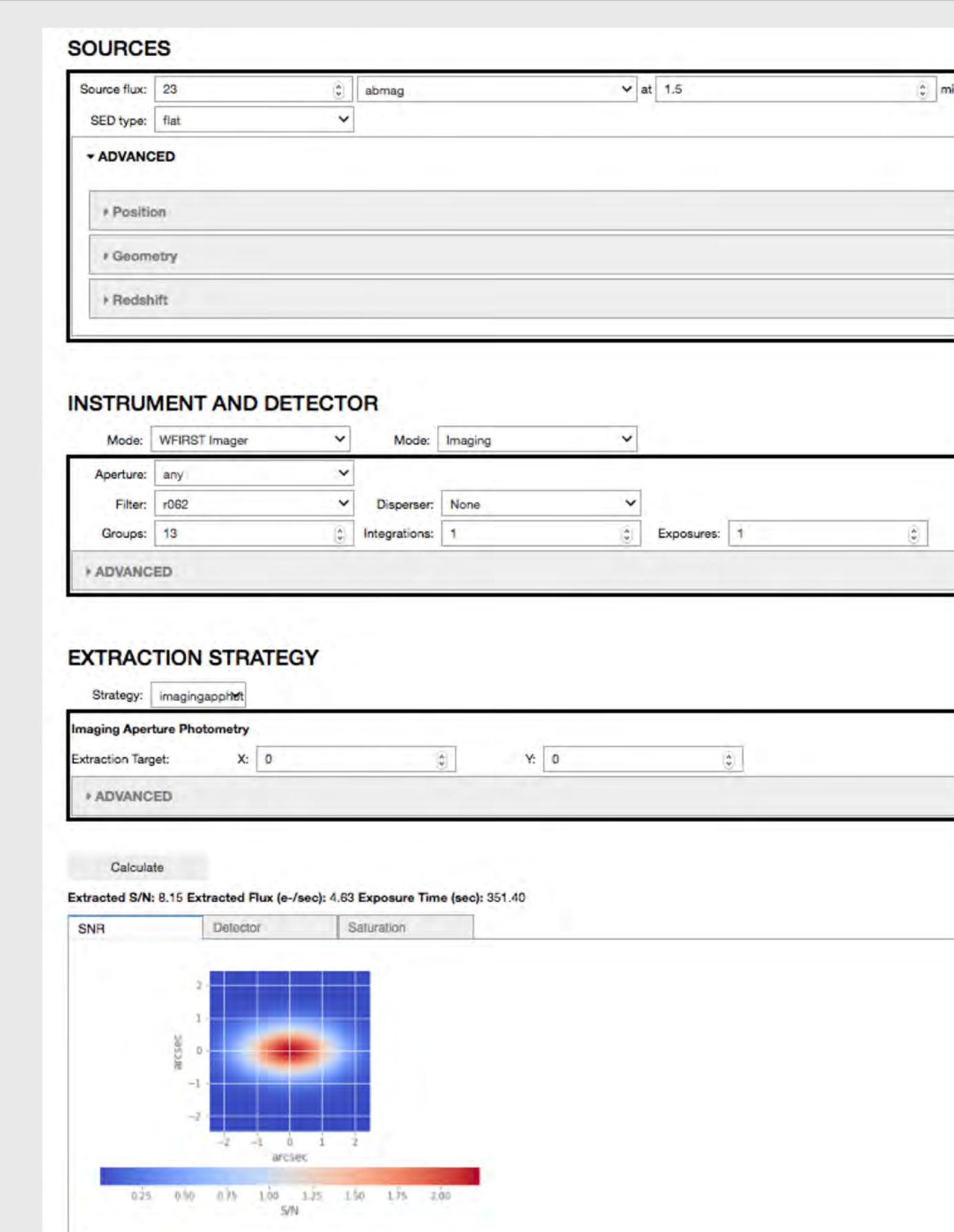
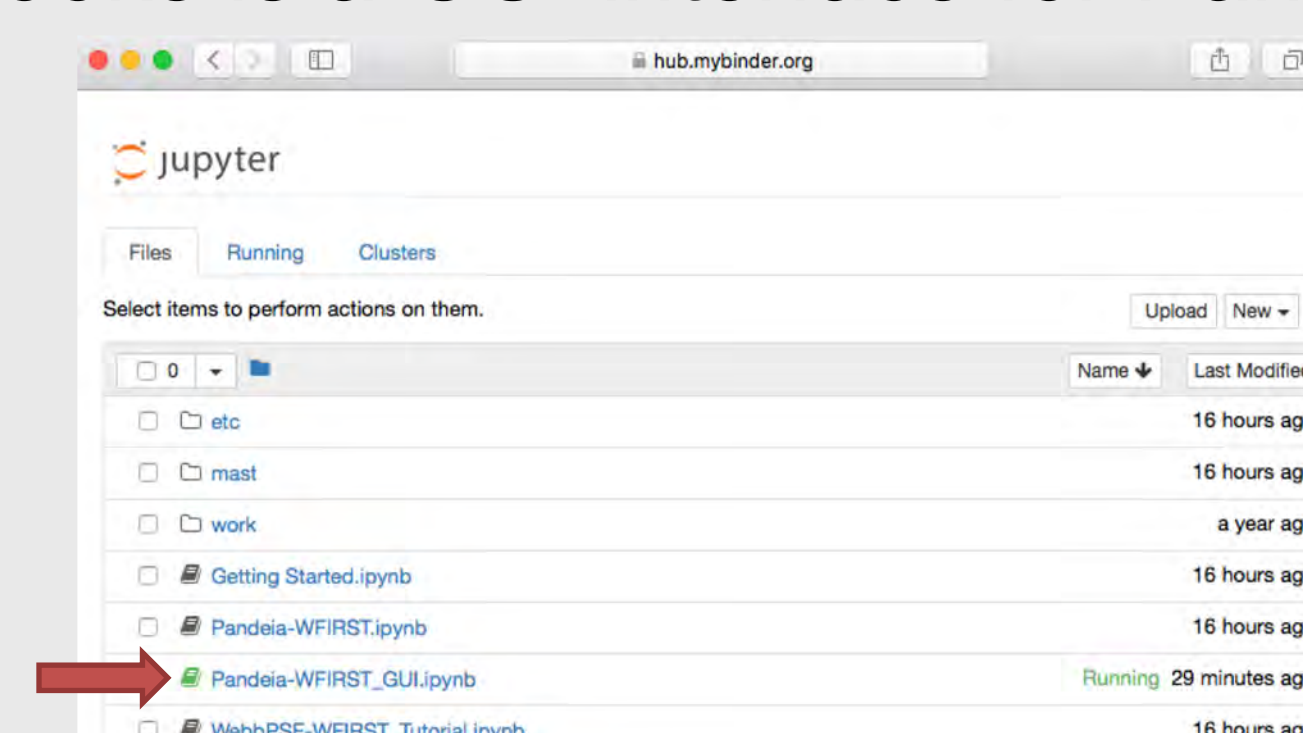
STIPS: Simulated WFI Images



The WFIRST implementation of STIPS enables simulation of complex astronomical scenes over the field of view (FOV) of one WFI detector. Above is a three color image of M83 created with STIPS by the WINGS WFIRST Science Investigation Team (PI Ben Williams, image credit: Rubab Khan). The image was created using a catalog derived from multiple HST pointings, which only partially fills the FOV (shown in black) of one WFI detector.

Accessing the Tools

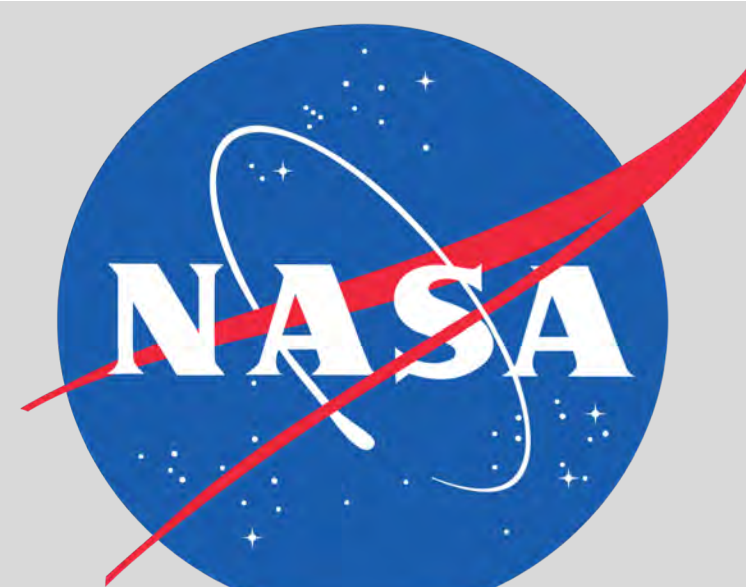
For initial exploration of WebbPSF and Pandaia for WFIRST, tutorial Jupyter notebooks can be launched in a temporary environment on Binder with a click of a link. Included in the set of tutorial notebooks is a GUI interface for Pandaia.



WebbPSF and Pandaia can be installed and run locally via a Docker container. The source codes of all three tools are also available for local installation.

Visit our GitHub repository for instructions and the tutorial notebooks: <https://github.com/spacetelescope/wfirst-tools>

A calculation for an extended source performed in the WFIRST ETC GUI, which is implemented in a Jupyter notebook that is available for use in Binder or with a local install of Pandaia.



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