

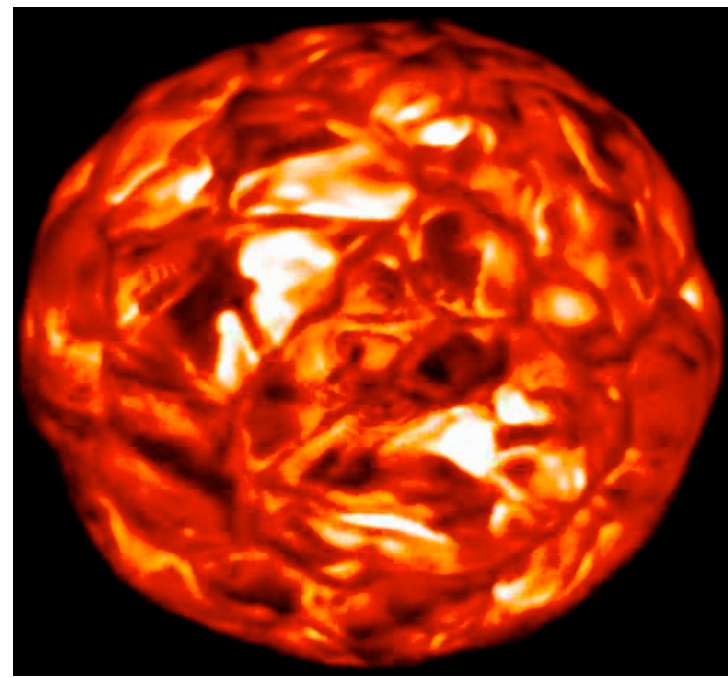
IMAGE-OI: an OIFITS extension for image reconstruction algorithms

Application to Olmaging

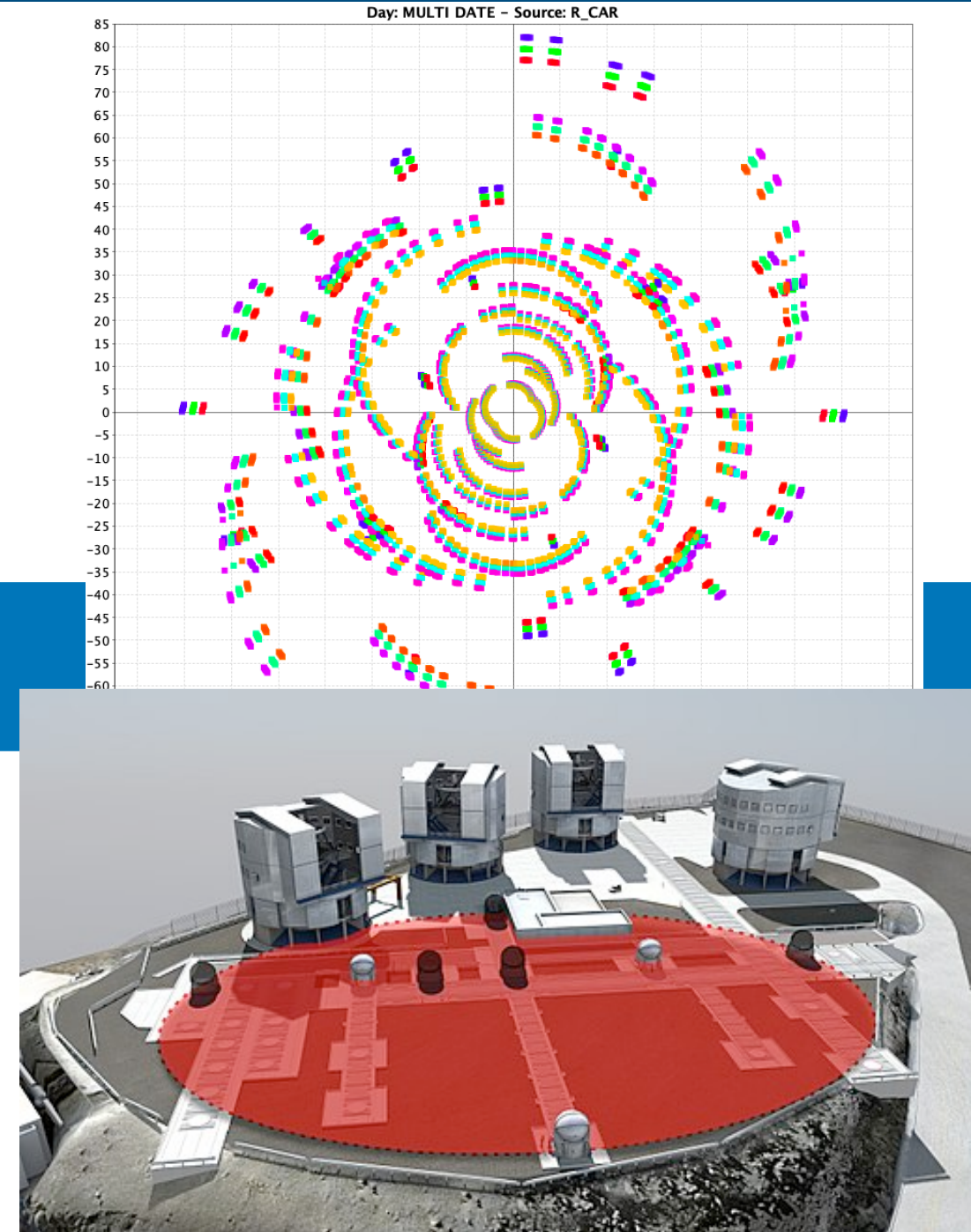
The logo for JMMC (Joint Multi-Mission Computing) features the letters 'JMMC' in a bold, italicized, sans-serif font. The letters are filled with a vibrant, multi-colored gradient of red, orange, and yellow, giving them a glowing, 3D appearance.

F. Soulez, L. Bourgès, A. Kaszczyc, G. Mella, M. Pratoussy, G. Duvert, J. Kluska, E. Thiébaud and J. Young

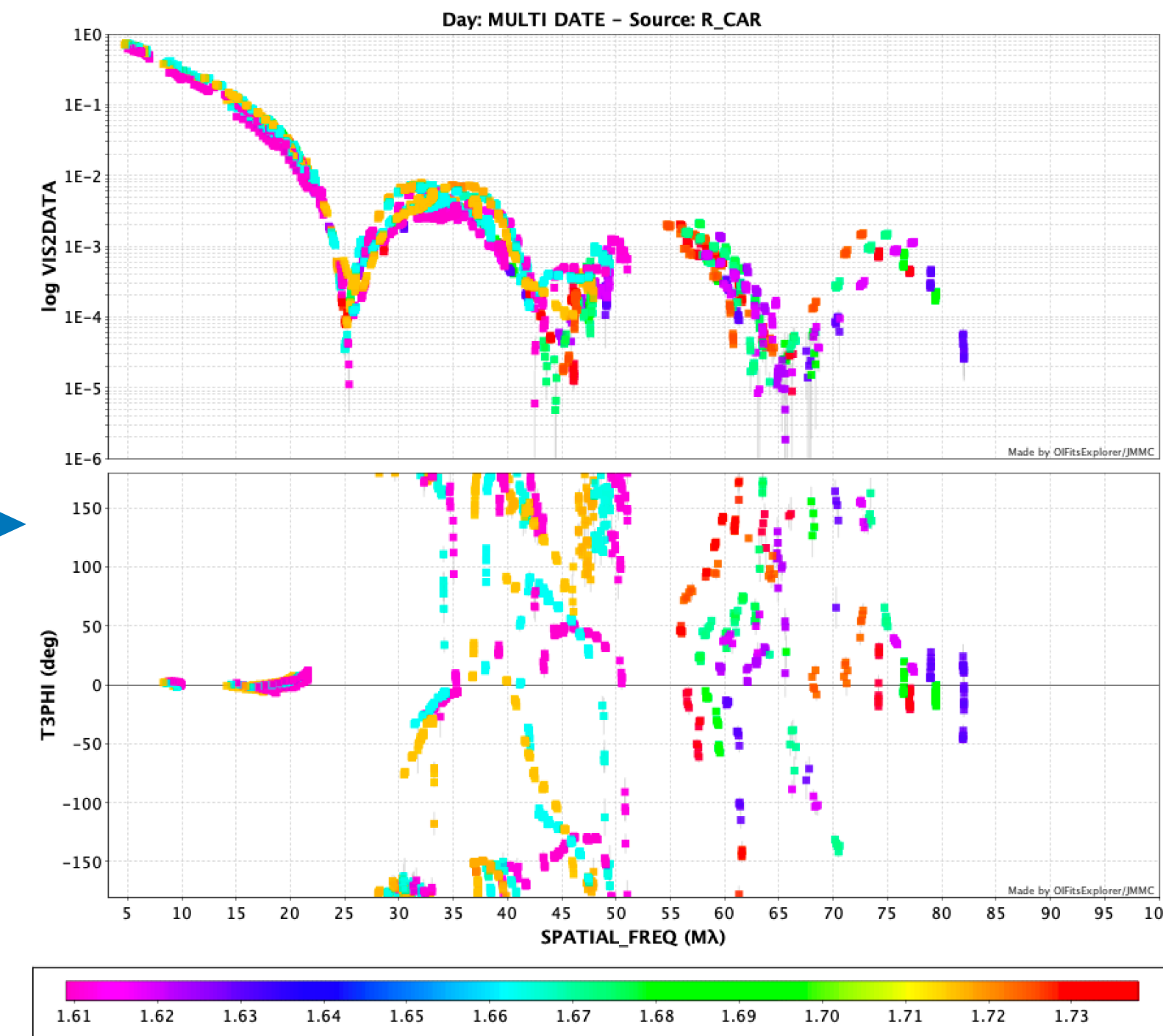
Image reconstruction in interferometry



Object



Interferometric instrument



Measurements

Image reconstruction

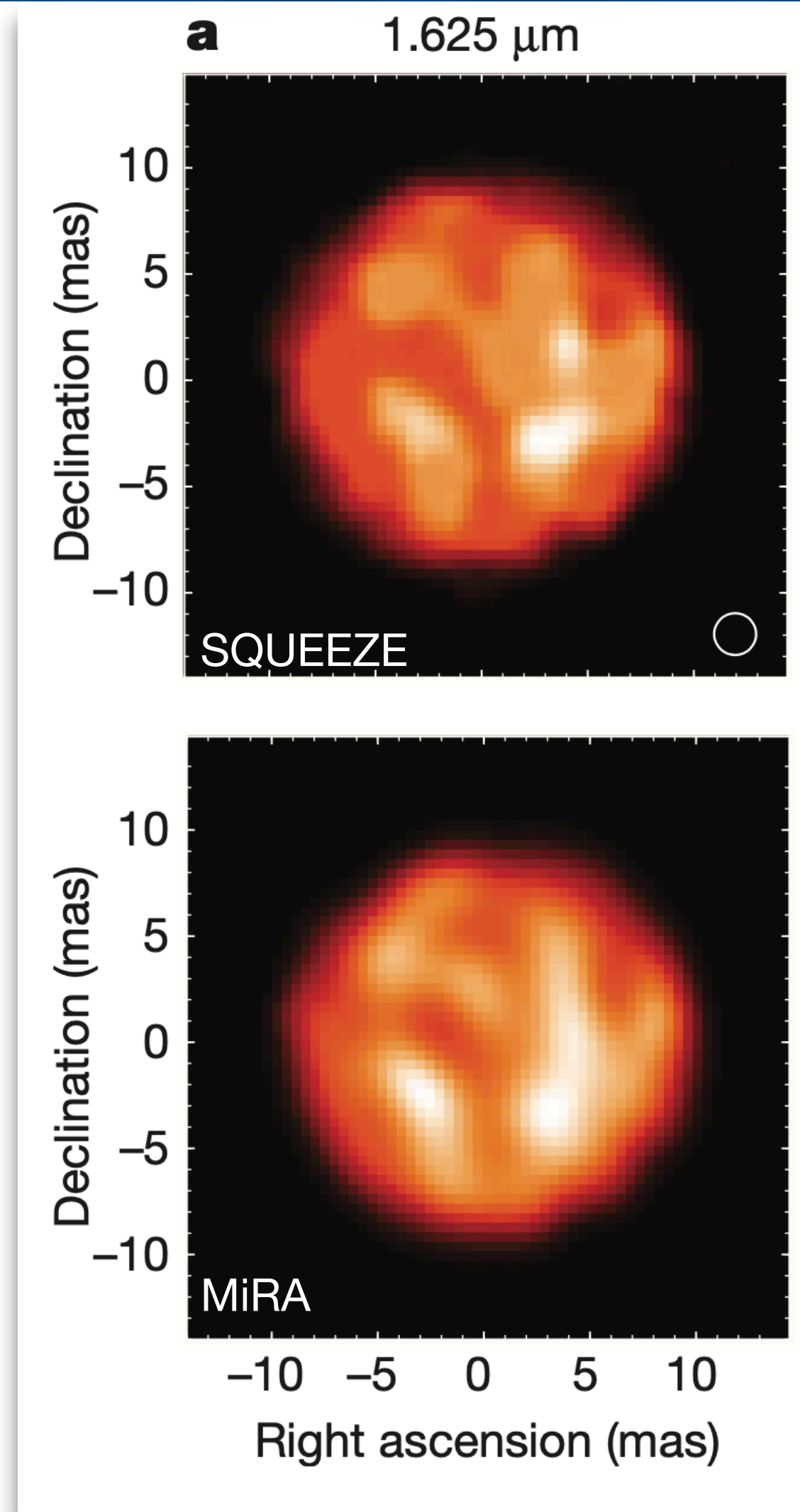
Image reconstruction softwares

- ◎ **BSMEM** (Buscher et al, 1994)
- ◎ **MACIM** (Ireland et al, 2006)
- ◎ **MIRA** (Thiébaud, 2008)
- ◎ **WISARD** (Mugnier et al 2008)
- ◎ **SQUEEZE** (Baron et al, 2010)
- ◎ **IRBIS** (Hoffman et al, 2014)
- ◎ **SPARCO** (Kluska et al, 2014)
- ◎ **ORGANIC** (Claes et al 2020)
- ◎ **G^R** (GRAVITY col., 2022)

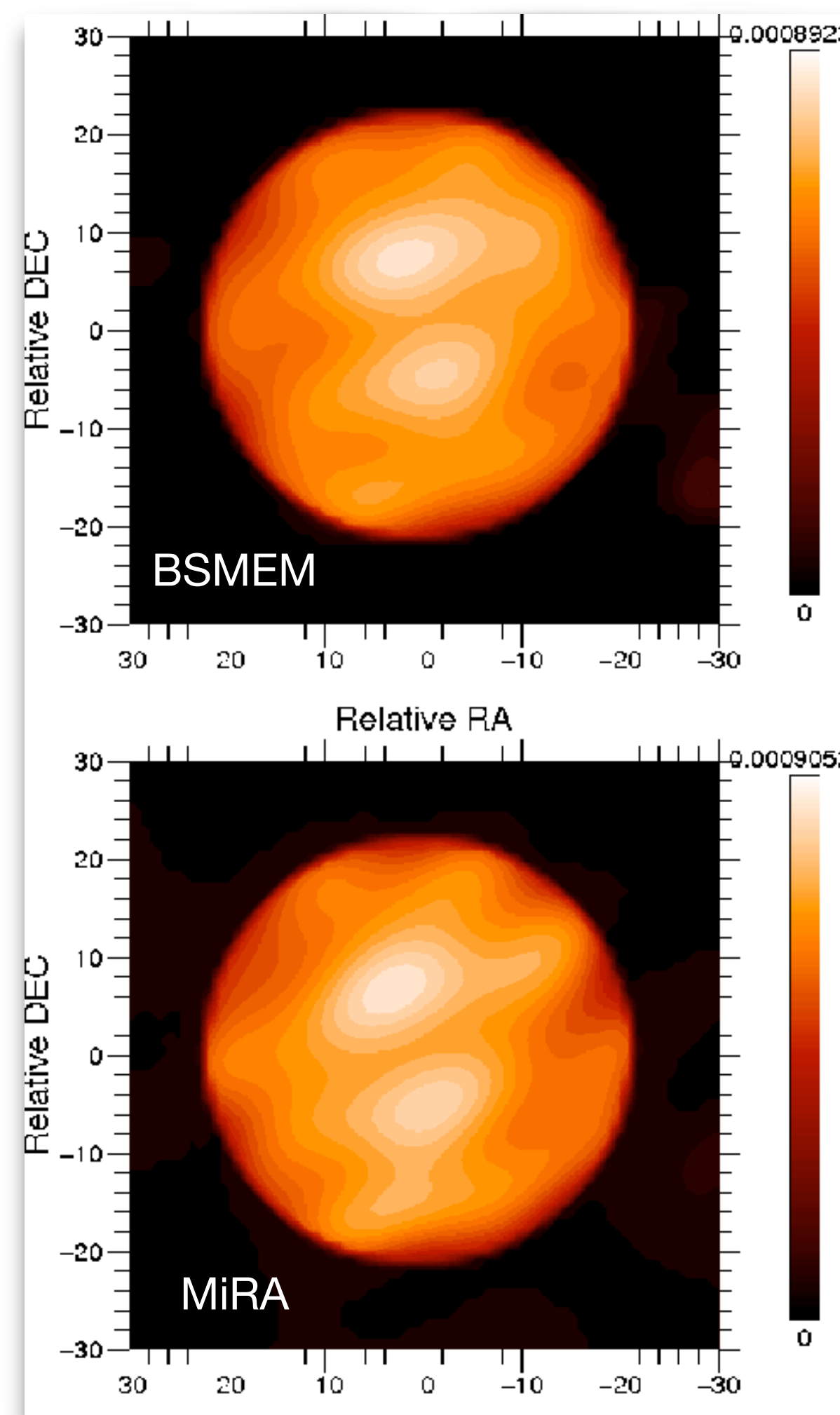
Image reconstruction softwares

- ◎ **BSMEM** (Buscher et al, 1994) C
- ◎ **MACIM** (Ireland et al, 2006) C
- ◎ **MIRA** (Thiébaud, 2008) yorick
- ◎ **WISARD** (Mugnier et al 2008) IDL
- ◎ **SQUEEZE** (Baron et al, 2010) C
- ◎ **IRBIS** (Hoffman et al, 2014) C
- ◎ **SPARCO** (Kluska et al, 2014) yorick or C
- ◎ **ORGANIC** (Claes et al 2020) python
- ◎ **G^R** (GRAVITY col., 2022) python

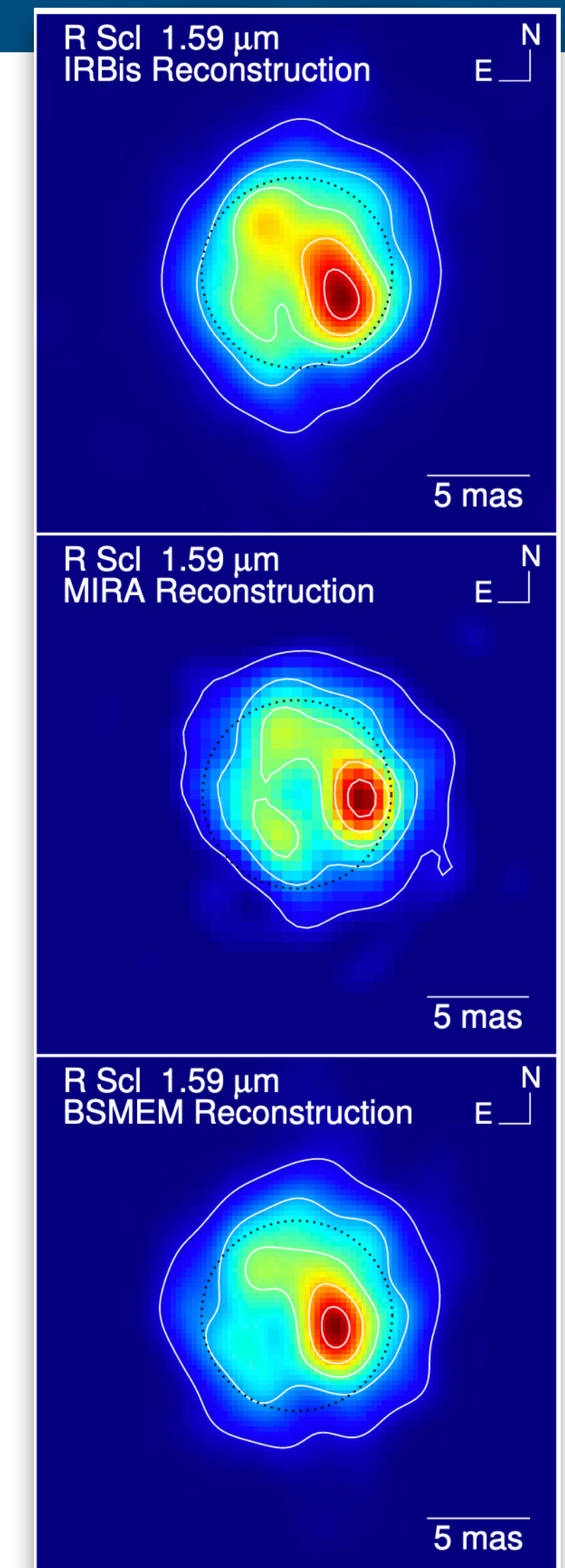
Needs: comparing reconstructions softwares



π^1 Gruis (Paladini, 2018)



Betelgeuse (Haubois, 2009)

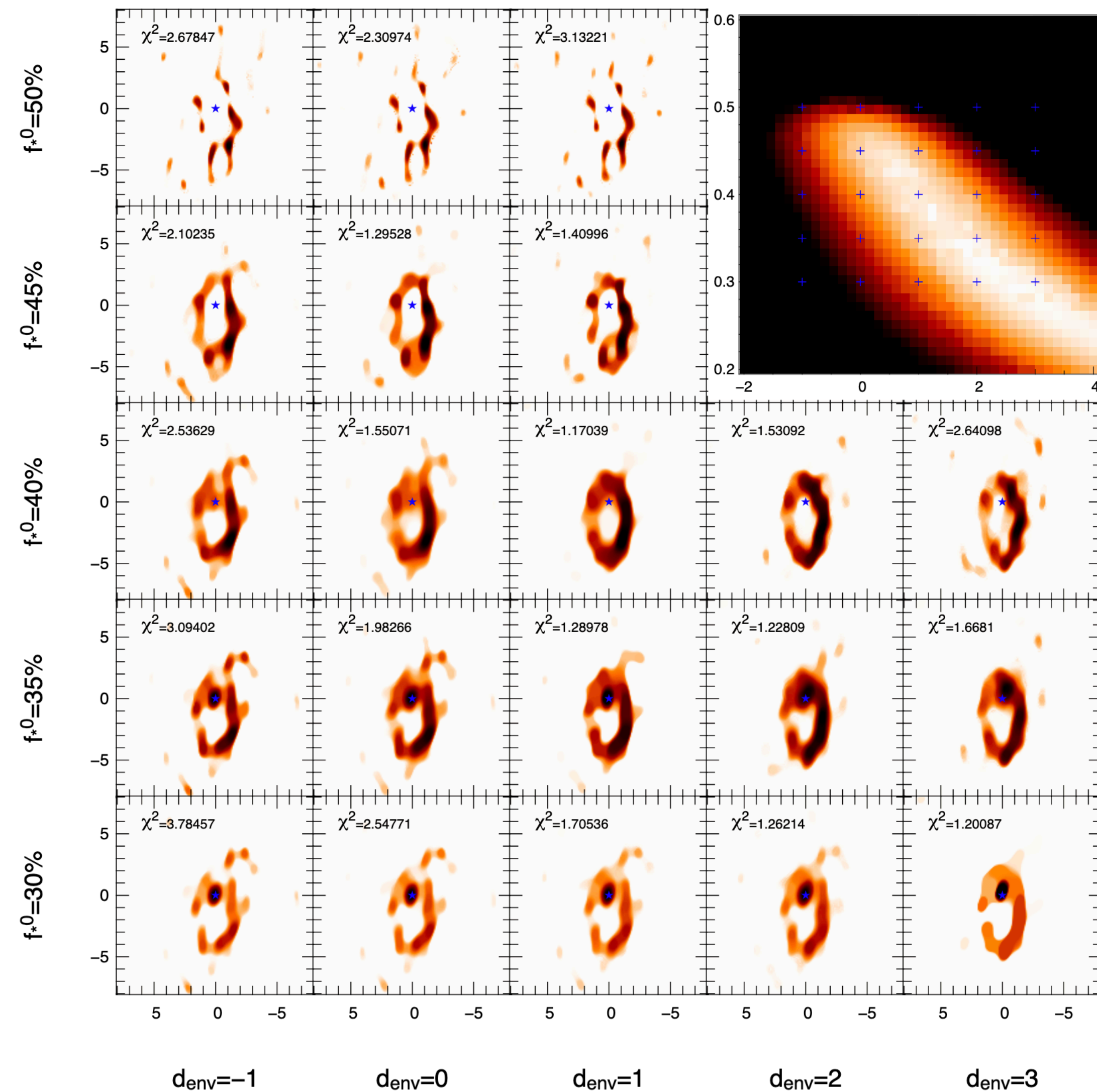


R Sculptoris (Wittkowski, 2017)

Needs: benchmarking parameters

Comparing results with different

- Priors
- Parameters
- Initialization



(Kluska, 2014)

Reconstruction algorithm in a nutshell

Input:

- Initial image
 - size
 - sampling
- Data
 - selection parameters
- Parameters
 - priors
 - hyper-parameters
 - number of iterations
 - ...



reconstruction algorithm

Output:

- Reconstructed image
- Model of the data
- Output parameters
 - Chi-square
 - cost function value
 - ...

Image-OI: an OIFITS extension for image reconstruction algorithms

Reconstructed image

OIFITS data

Initial image

Input parameters

Output parameters

Index	Extension	Type
0	Primary	Image
1	OI_TARGET	Binary
2	OI_ARRAY	Binary
3	OI_WAVELENGTH	Binary
4	OI_VIS2	Binary
5	OI_T3	Binary
6	IMAGE-OI INITIAL IMAGE	Image
7	IMAGE-OI INPUT PARAM	Binary
8	IMAGE-OI OUTPUT PARAM	Binary

Input parameters

Input parameters stored in the header of 'IMAGE-OI INPUT PARAM' HDU.

Data Selection (mandatory)		
Keyword	Type	Description
TARGET	string	Identifier of the target object to reconstruct
WAVE_MIN	real	Minimum wavelength to select (in meters)
WAVE_MAX	real	Maximum wavelength to select (in meters)
USE_VIS	string	Complex visibility data to consider if any [†]
USE_VIS2	logical	Use squared visibility data if any
USE_T3	string	Bispectrum data to consider if any [†]

[†] value can be: 'NONE', 'ALL', 'AMP' or 'PHI'.

Algorithm Settings		
Keyword	Type	Description
INIT_IMG	string	Identifier of the initial image
MAXITER	integer	Maximum number of iterations to run
RGL_NAME	string	Name of the regularization method
AUTO_WGT	logical	Automatic regularization weight
RGL_WGT	real	Weight of the regularization
RGL_PRIO	string	Identifier of the HDU with the prior image
FLUX	real	Assumed total flux (1 is the default)
FLUXERR	real	Error bar for the total flux (0 means strict constraint)
HDUPREFIX	string	Prefix that specifies the leading text to use in the HDUNAME of the final image

More complex inputs can be stored in the HDU itself

Initial image

Initial image set the field of view and the pixel size of the reconstruction

Image Parameters

Keyword	Type	Description
HDUNAME	string	Unique name for the image within the FITS file
NAXIS1	integer	First dimension of the image
NAXIS2	integer	Second dimension of the image
CTYPE1	string	Coordinate name 'RA---TAN' for 1st axis
CTYPE2	string	Coordinate name 'DEC--TAN' for 2nd axis
CDELT <i>i</i>	real	Physical increment along <i>i</i> -th dimension of the image (for <i>i</i> = 1 or 2)
CUNIT <i>i</i>	string	Physical units for CDELT <i>i</i> and CRVAL <i>i</i> ; defaults to 'deg' if omitted
CRPIX <i>i</i>	real	Index of reference pixel along <i>i</i> -th dimension (for <i>i</i> = 1 or 2); defaults to the geometric center of the field of view if omitted
CRVAL <i>i</i>	real	Physical coordinate of reference pixel along <i>i</i> -th dimension (for <i>i</i> = 1 or 2) and relative to the center of the field of view; defaults to 0 if omitted

Can be a simple shape or a more complex object generated by model fitting tool

Reconstructed image and output parameters

Reconstructed image is stored in the primary HDU

Most FITS viewer opens the primary by default

Reconstructed image and output parameters

Reconstructed image is stored in the primary HDU

Most FITS viewer opens the primary by default

Output parameters are stored in the header of 'IMAGE-OI OUTPUT PARAM' HDU

Algorithm Results		
Keyword	Type	Description
LAST_IMG	string	Identifier of the final image
NITER	integer	Total iterations done in the current program run
CHISQ	real	Reduced chi-squared
FPRIOR	real	Regularization penalty
FLUX	real	Total image flux
PROCSOFT	string	Software name and version number
CONVERGE	boolean	Set to 'T' if the algorithm stopped because it has converged

Modeled data

Extra column next to the data containing the model and optionally its errors

New columns in 0I_VIS tables		
Label	Format	Description
NS_MODEL_VISAMP	D(NWAVE)	Model of the visibility amplitude
NS_MODEL_VISAMPERR	D(NWAVE)	Model of the error in visibility amplitude (optional)
NS_MODEL_VISPHI	D(NWAVE)	Model of the visibility phase in degrees
NS_MODEL_VISPHIERR	D(NWAVE)	Model of the error in visibility phase in degrees (optional)

New columns in 0I_VIS2 tables		
Label	Format	Description
NS_MODEL_VIS2	D(NWAVE)	Model of the squared visibility
NS_MODEL_VIS2ERR	D(NWAVE)	Model of the error in squared visibility (optional)

New columns in 0I_T3 tables		
Label	Format	Description
NS_MODEL_T3AMP	D(NWAVE)	Model of the triple-product amplitude
NS_MODEL_T3AMPERR	D(NWAVE)	Model of the error in triple-product amplitude (optional)
NS_MODEL_T3PHI	D(NWAVE)	Model of the triple-product phase in degrees
NS_MODEL_T3PHIERR	D(NWAVE)	Model of the error in triple-product phase in degrees (optional)

Image-OI: a common extension to connect them all

A unified way to call reconstruction softwares

- Every information in a single OI-FITS file
- Simpler interaction with softwares
- Reproducible results

The screenshot shows the GitHub repository page for `JMMC-OpenDev / OI-Imaging-JRA`. The repository is public and has 4 stars, 6 watchers, and 6 forks. The main content area displays a file tree with the following items:

File/Folder	Commit Message	Commit Date
<code>.github/workflows</code>	Update main.yml	last month
<code>doc</code>	Add keywords CONVERGE and PROCISOFT in OUTPUT PARAM t...	last month
<code>.gitattributes</code>	Initial commit	7 years ago
<code>.gitignore</code>	Initial commit	7 years ago
<code>README.md</code>	fix typo in README	last month

The `README.md` file is open, showing the following content:

OI-Interface

Design and specification of an interface to image reconstruction and model fitting from optical interferometric data.

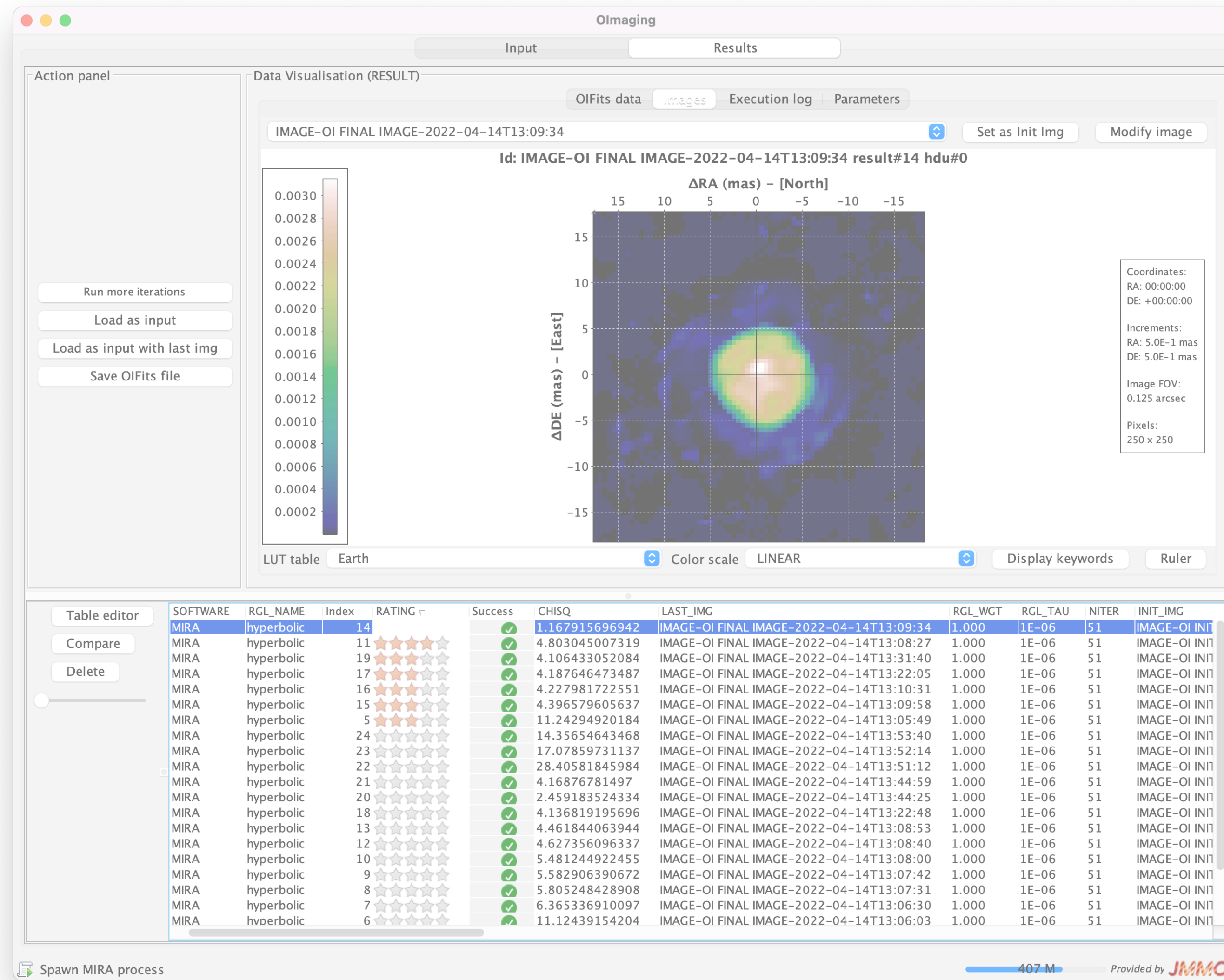
Contents

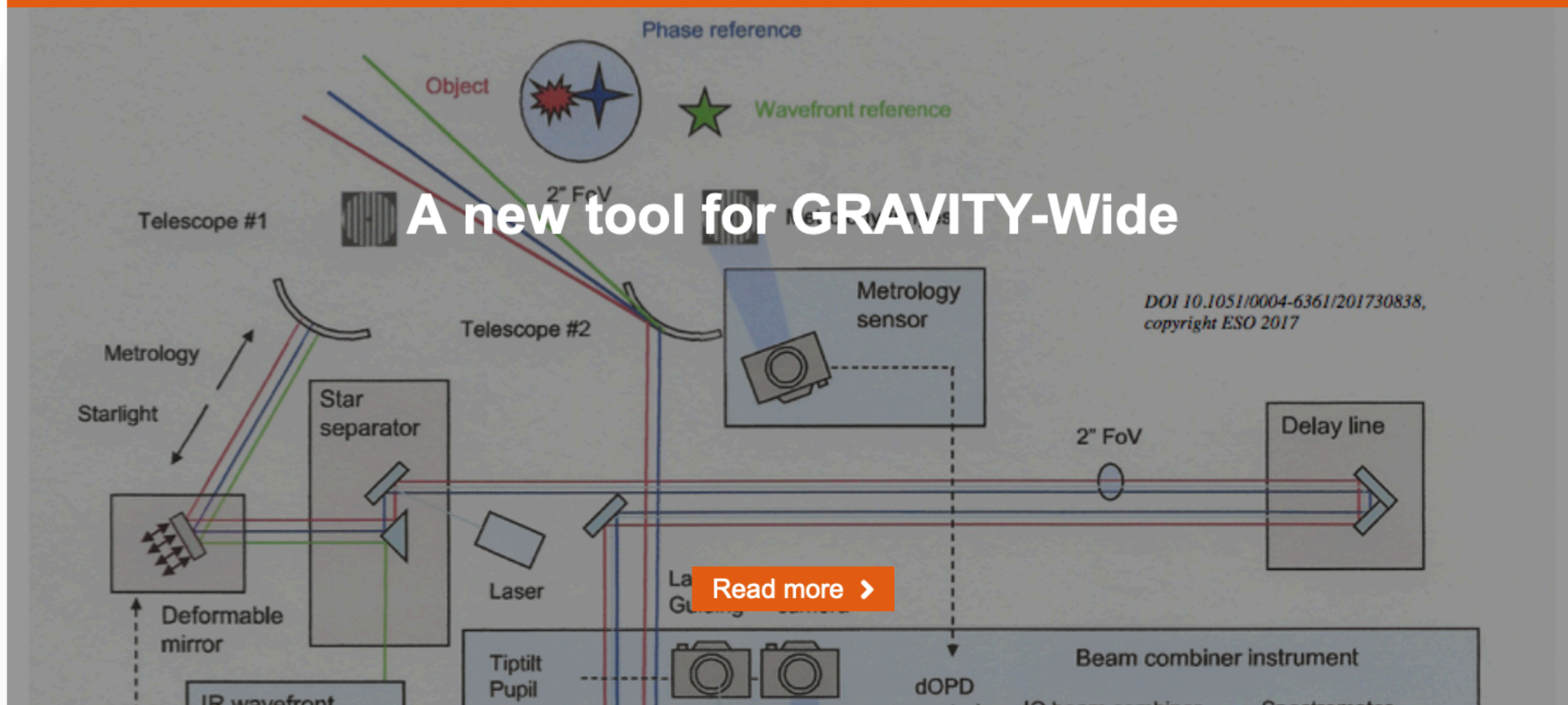
- [Unified Image Reconstruction Description](#) exploits the *inverse problem* framework to present the general principles of image reconstruction from interferometric data.
- [Interface to Image Reconstruction](#) is a draft document giving the specifications for a graphical user interface to control image reconstruction algorithms.
- Directory `doc` contains the sources of the various documents.

The right sidebar contains the following sections:

- About:** Design and specification of an interface to image reconstruction and model fitting from optical interferometric data. 4 stars, 6 watching, 6 forks.
- Releases:** 1 tag. [Create a new release](#)
- Packages:** No packages published. [Publish your first package](#)
- Contributors (3):**
 - `emmt` Éric Thiébaud
 - `jsy1001` John Young
 - `FerreolIS` ferreol soulez

A single graphical user interface for image reconstruction algorithms





The Mission

The JMMC is the french center for optical interferometry. It aims at providing support for **the users** of the stellar interferometers currently in operation. This support is possible thanks to the development of efficient and using friendly tools for preparing the observations, analysing the data or archiving the results. The tools are accessible through the web site and linked to a **"Face to Face" help**, especially for the preparation of observations, the PIONIER, GRAVITY and MATISSE data reduction, and the data analysis.

[Who are we? >](#)

JMMC User Support

The JMMC is committed to provide support to the users of the VLT and other interferometers. For this purpose, a single **contact e-mail address** has been created. You can also fill the dedicated feedback form. Access by click on "Read more".

[Read more >](#)

ASPRO

SEARCHCAL

LITPRO

OIFITSEXPLORER

OIMAGING

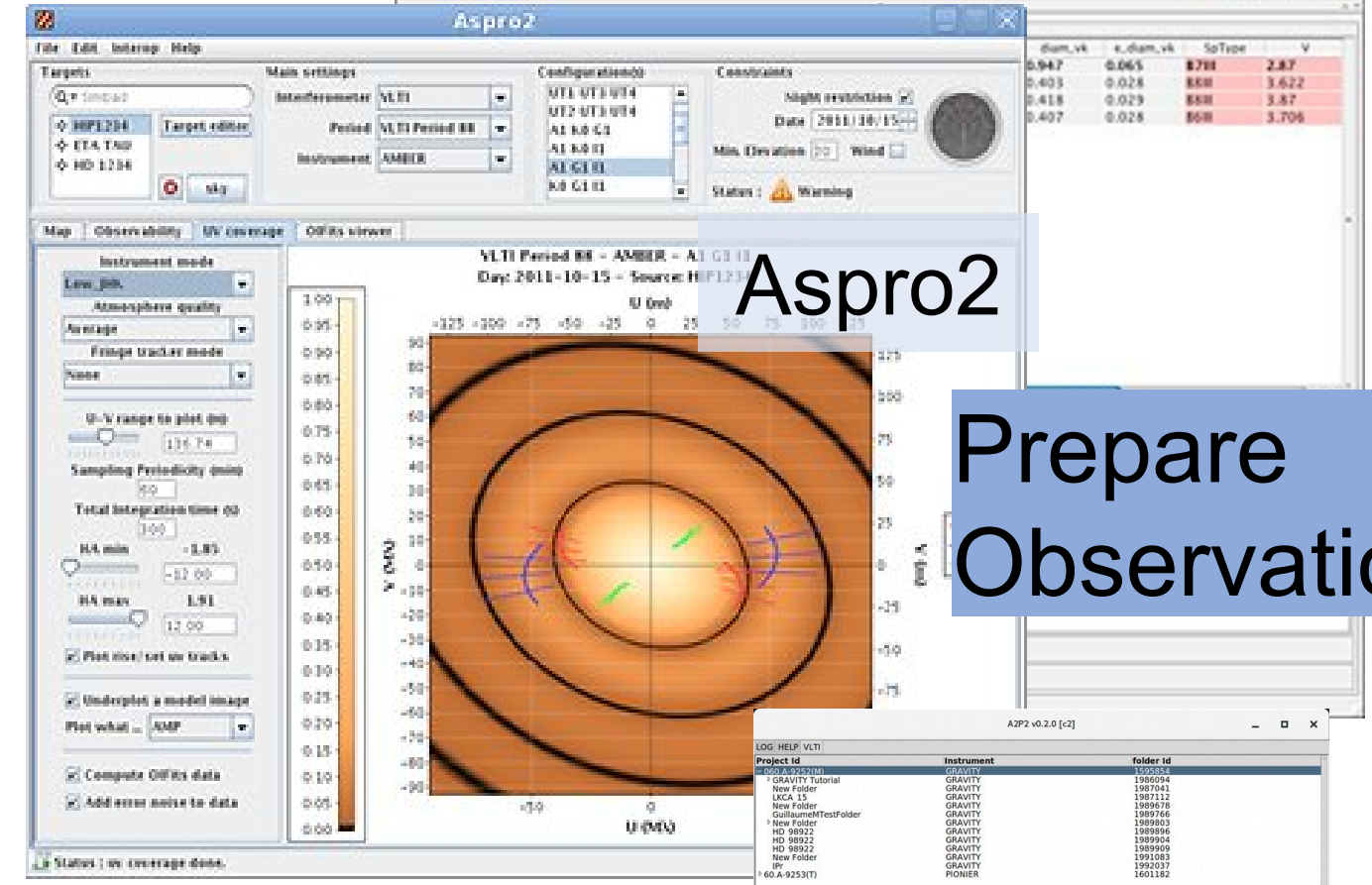
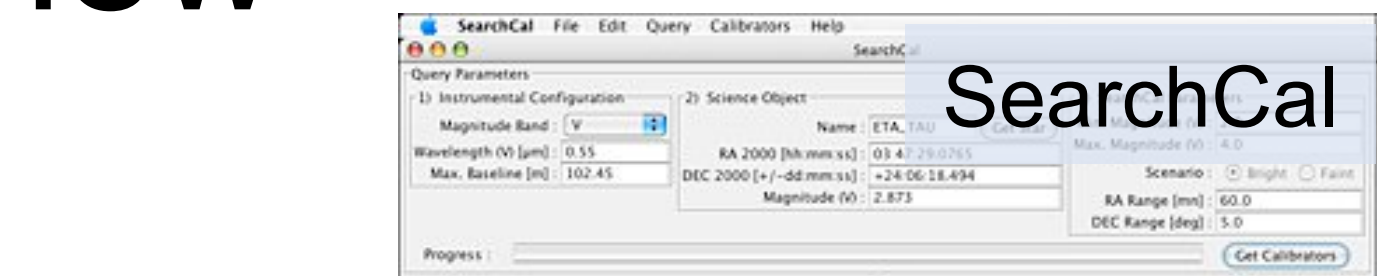
OIDB

JMMC Service overview



SUV (VLTI Center):

- + User Support
- + Training



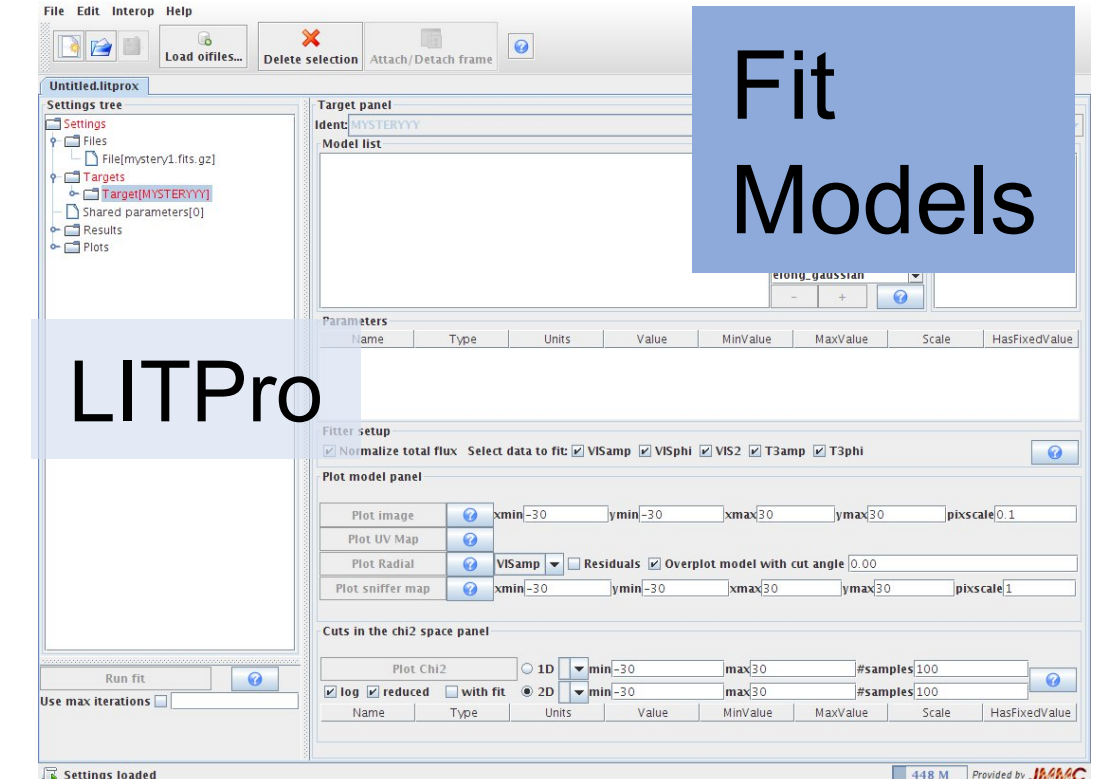
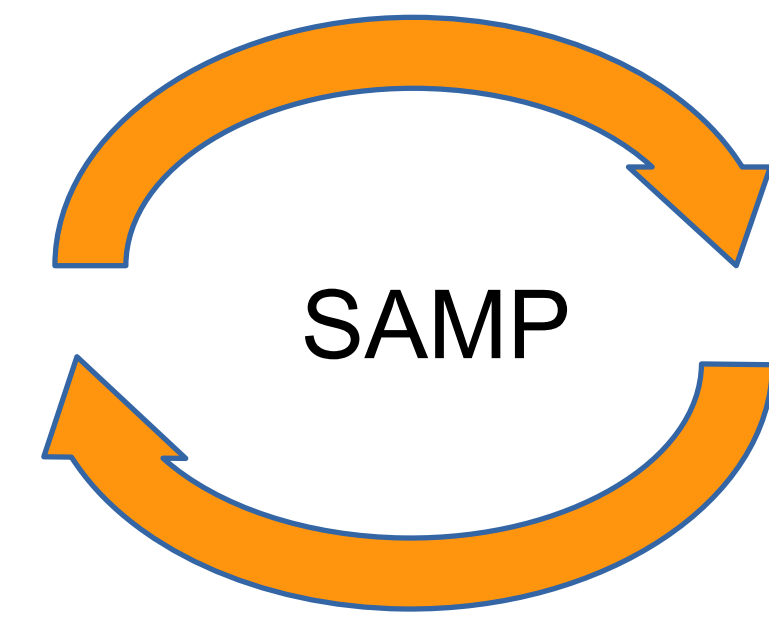
Reduce data

amdlib
pndrs



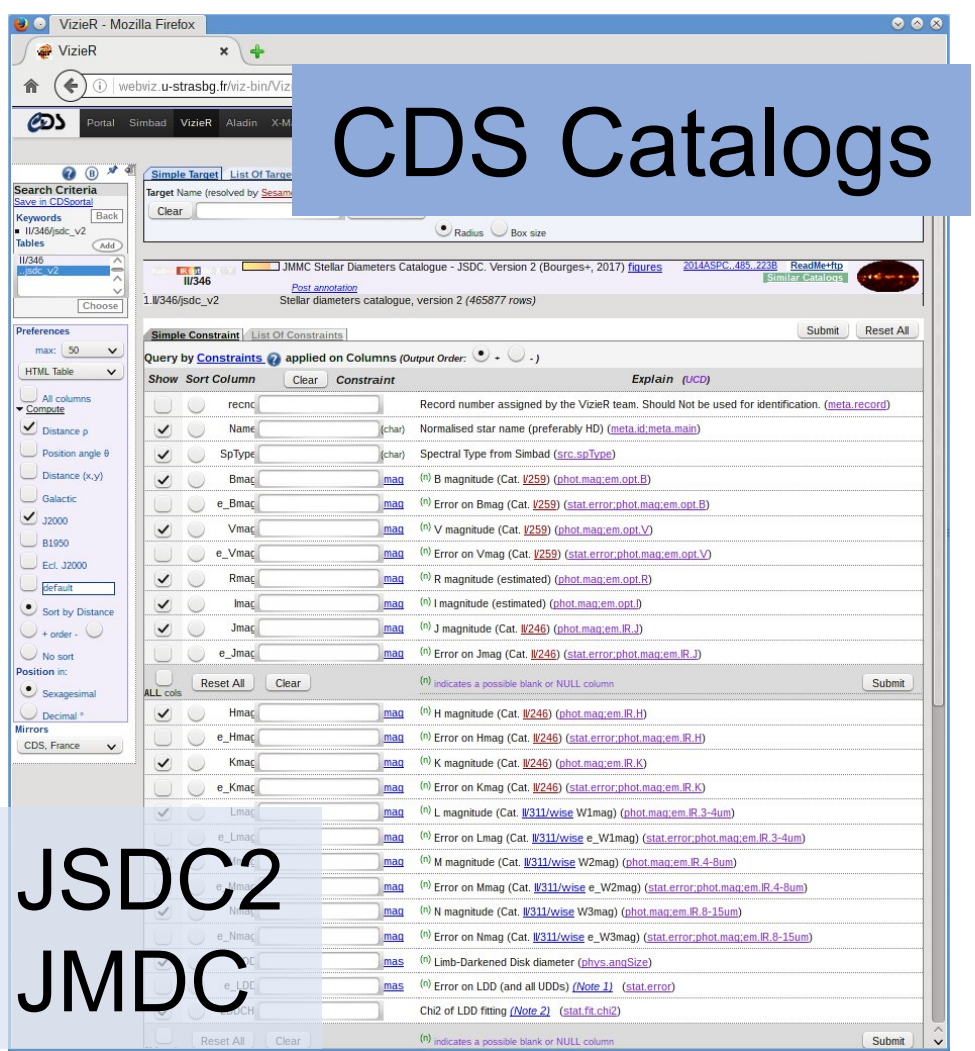
View Data

OIFits Explorer

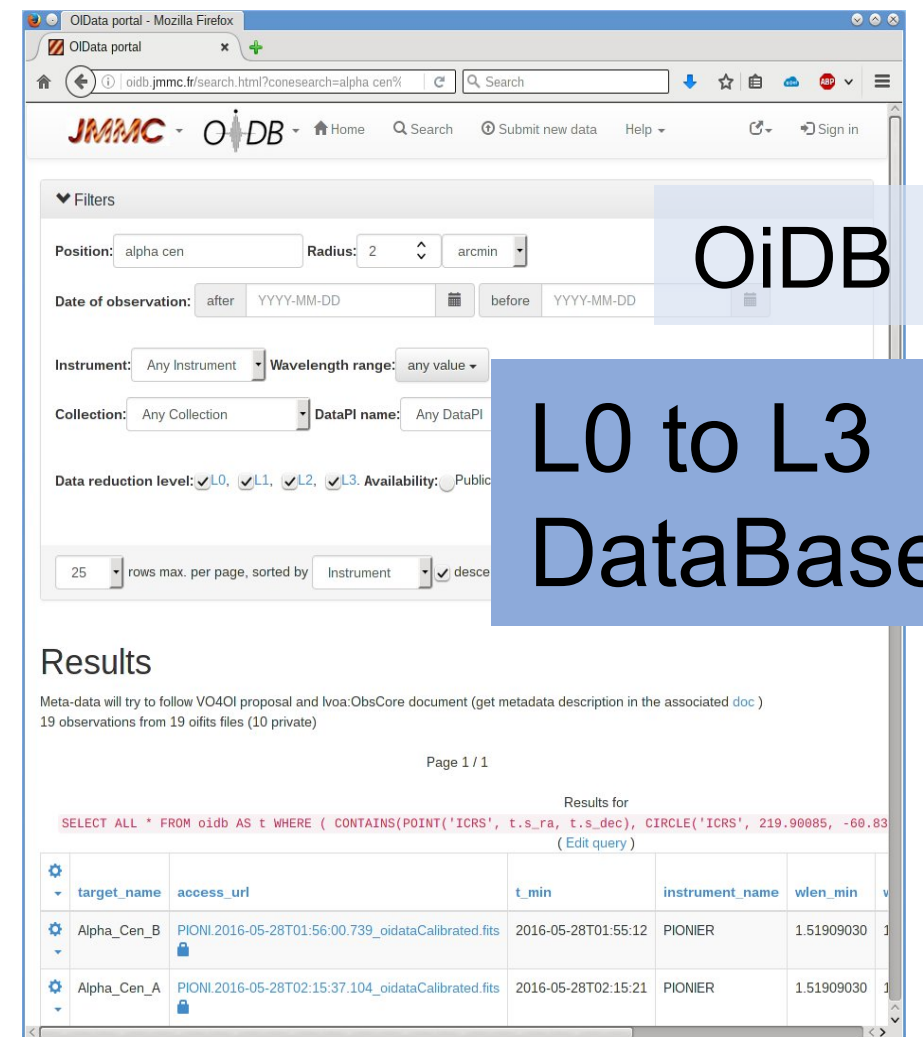


Fit Models

LITPro

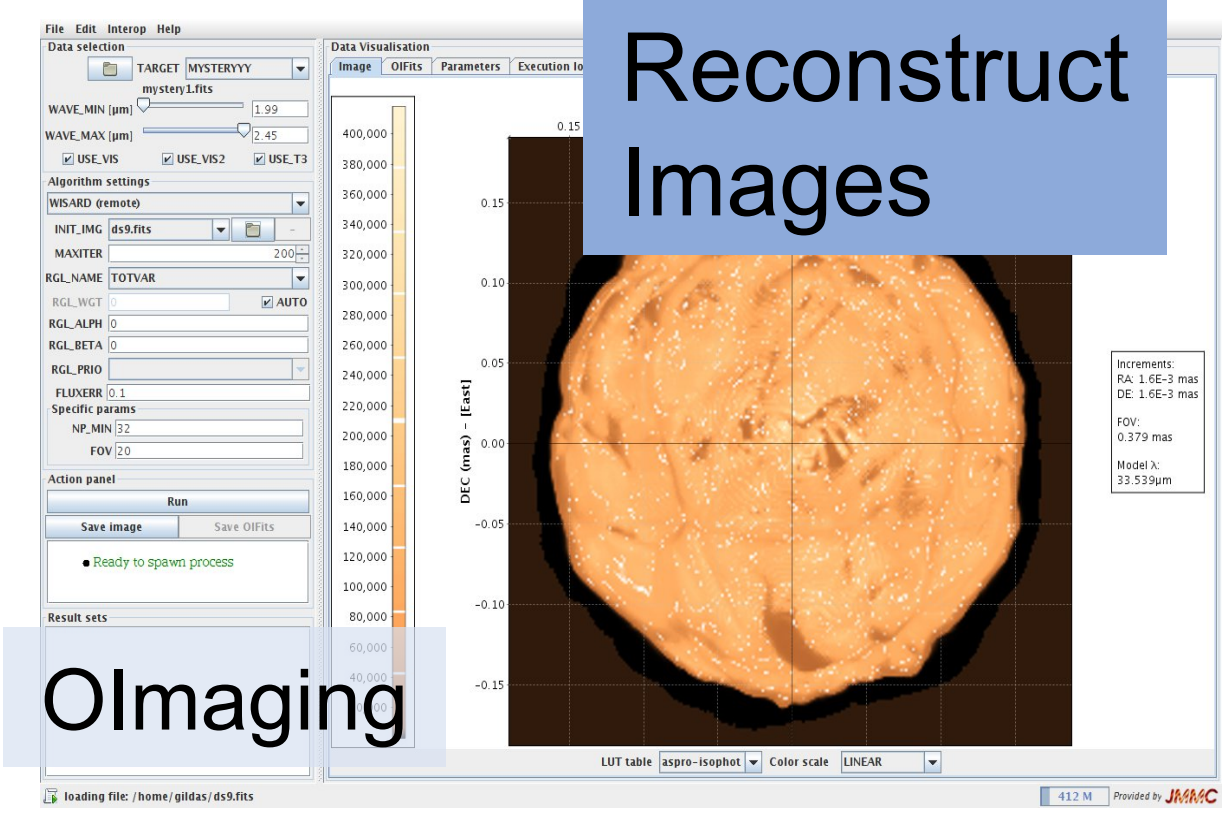


CDS Catalogs



OidB

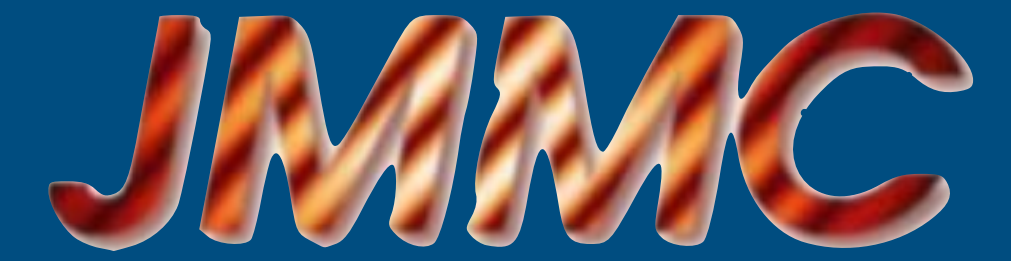
L0 to L3
DataBases



Reconstruct Images

Olmaging

Image reconstruction workflow

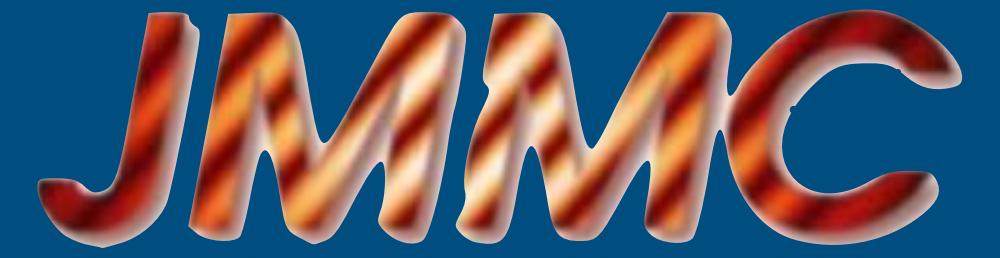


https://youtu.be/YA3hvs_sOfE

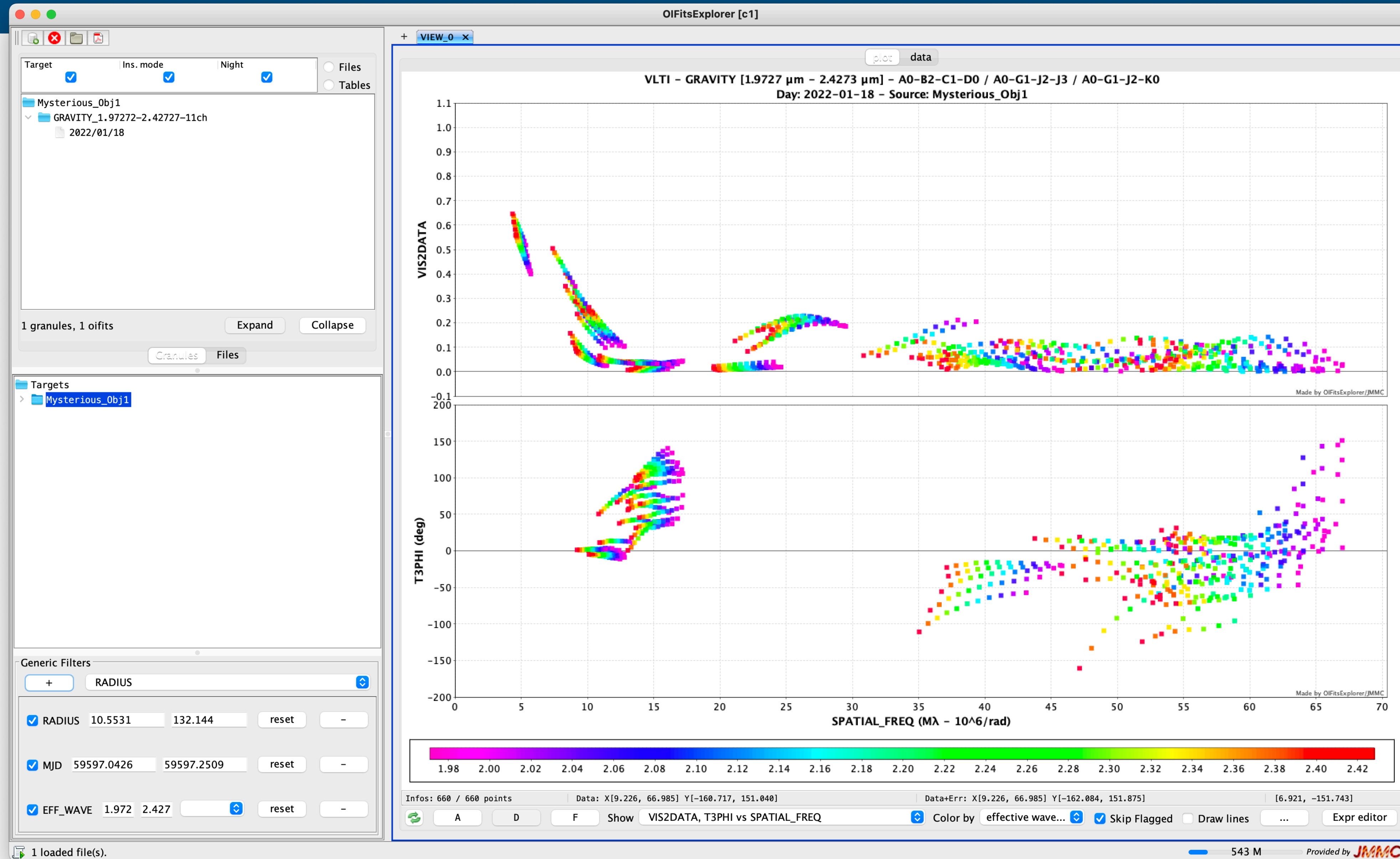
The screenshot displays the OIFits Explorer software interface. The main window shows two scatter plots. The top plot is titled "VLTI - PIONIER [1.6238 μm - 1.7287 μm] / [1.624 μm - 1.7296 μm] - A1-B2-C1-D0 / D0-G1-H0-I1" and shows log VIS2DATA on the y-axis (ranging from 1E-5 to 1E0) versus SPATIAL_FREQ (MX) on the x-axis (ranging from 0 to 53). The bottom plot shows T3PHI (deg) on the y-axis (ranging from -200 to 200) versus SPATIAL_FREQ (MX) on the x-axis (ranging from 0 to 53). A color bar at the bottom indicates effective wavelength from 1.625 to 1.730 μm . The video player controls at the bottom show a play button and a progress bar at 0:00 / 20:13.

Interferometric image reconstruction with OImaging

OIFitsExplorer: data handling tool

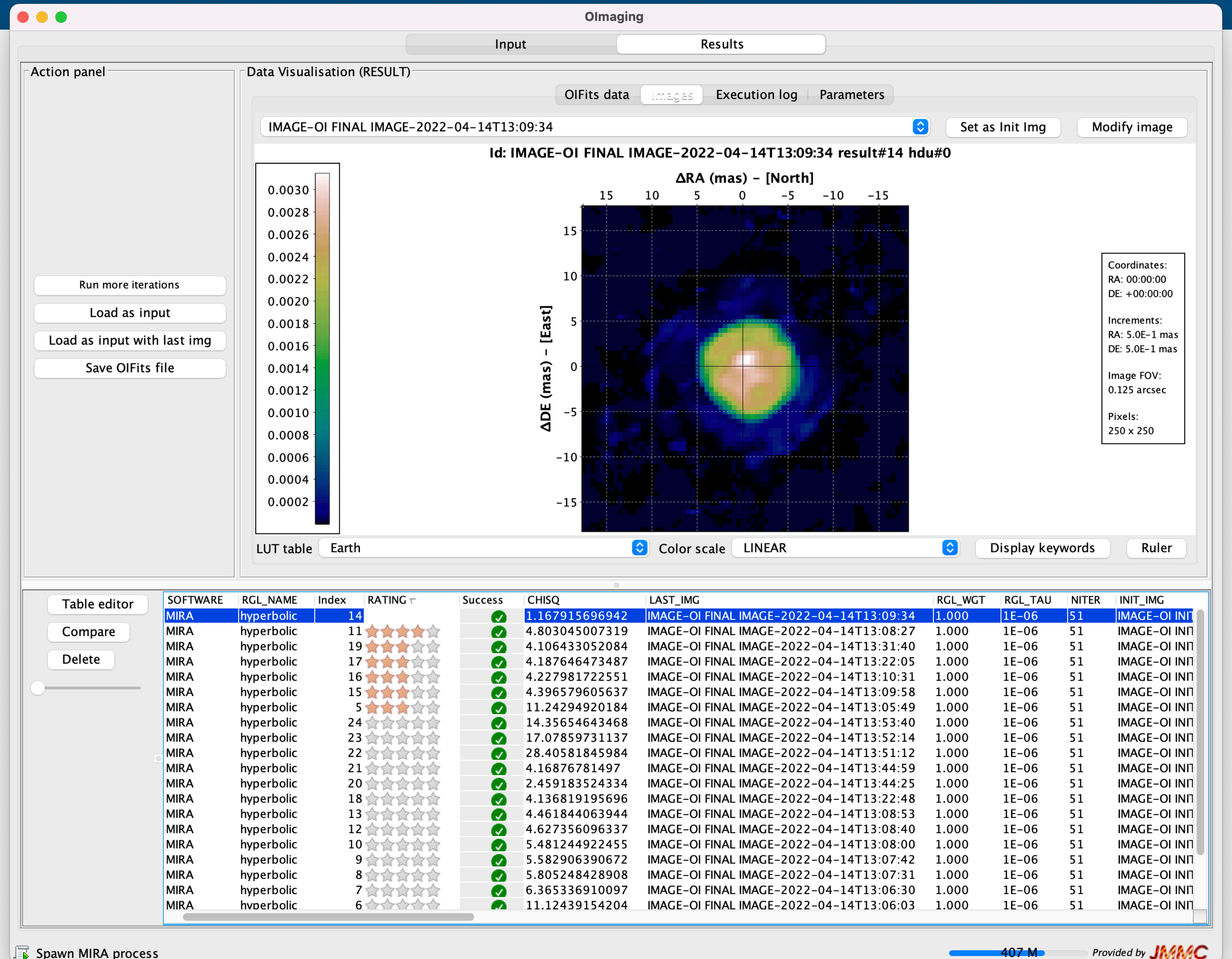


New version today!



© A single interface

- 4 softwares: BSMEM, MiRA, SPARCO, WISARD
- results in a single table
- rating, comparing, ...
- saving reconstruction parameters with the image

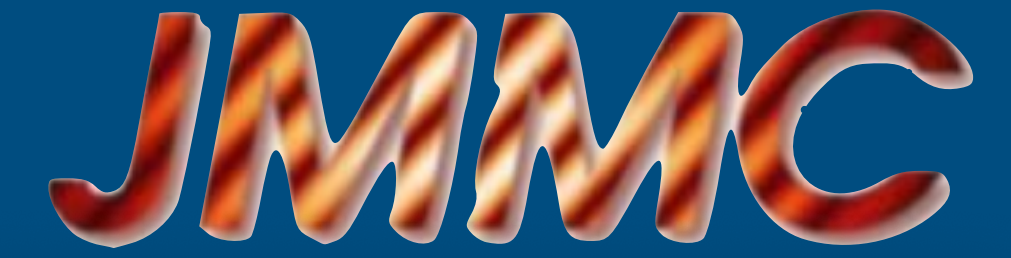


The screenshot displays the OImaging software interface. The top section shows the 'Data Visualisation (RESULT)' tab, featuring a heatmap of ΔRA (mas) - [North] vs ΔDE (mas) - [East]. The heatmap shows a central bright spot with a color scale ranging from 0.0002 to 0.0030. The bottom section shows a table of results for various software instances.

SOFTWARE	RGL_NAME	Index	RATING	Success	CHISQ	LAST_IMG	RGL_WGT	RGL_TAU	NITER	INIT_IMG
MIRA	hyperbolic	14	★★★★★	✓	1.167915696942	IMAGE-OI FINAL IMAGE-2022-04-14T13:09:34	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	11	★★★★★	✓	4.803045007319	IMAGE-OI FINAL IMAGE-2022-04-14T13:08:27	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	19	★★★★★	✓	4.106433052084	IMAGE-OI FINAL IMAGE-2022-04-14T13:31:40	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	17	★★★★★	✓	4.187646473487	IMAGE-OI FINAL IMAGE-2022-04-14T13:22:05	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	16	★★★★★	✓	4.227981722551	IMAGE-OI FINAL IMAGE-2022-04-14T13:10:31	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	15	★★★★★	✓	4.396579605637	IMAGE-OI FINAL IMAGE-2022-04-14T13:09:58	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	5	★★★★★	✓	11.24294920184	IMAGE-OI FINAL IMAGE-2022-04-14T13:05:49	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	24	★★★★★	✓	14.35654643468	IMAGE-OI FINAL IMAGE-2022-04-14T13:53:40	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	23	★★★★★	✓	17.07859731137	IMAGE-OI FINAL IMAGE-2022-04-14T13:52:14	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	22	★★★★★	✓	28.40581845984	IMAGE-OI FINAL IMAGE-2022-04-14T13:51:12	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	21	★★★★★	✓	4.16876781497	IMAGE-OI FINAL IMAGE-2022-04-14T13:44:59	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	20	★★★★★	✓	2.459183524334	IMAGE-OI FINAL IMAGE-2022-04-14T13:44:25	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	18	★★★★★	✓	4.136819195696	IMAGE-OI FINAL IMAGE-2022-04-14T13:22:48	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	13	★★★★★	✓	4.461844063944	IMAGE-OI FINAL IMAGE-2022-04-14T13:08:53	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	12	★★★★★	✓	4.627356096337	IMAGE-OI FINAL IMAGE-2022-04-14T13:08:40	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	10	★★★★★	✓	5.481244922455	IMAGE-OI FINAL IMAGE-2022-04-14T13:08:00	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	9	★★★★★	✓	5.582906390672	IMAGE-OI FINAL IMAGE-2022-04-14T13:07:42	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	8	★★★★★	✓	5.805248428908	IMAGE-OI FINAL IMAGE-2022-04-14T13:07:31	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	7	★★★★★	✓	6.365336910097	IMAGE-OI FINAL IMAGE-2022-04-14T13:06:30	1.000	1E-06	51	IMAGE-OI INI
MIRA	hyperbolic	6	★★★★★	✓	11.12439154204	IMAGE-OI FINAL IMAGE-2022-04-14T13:06:03	1.000	1E-06	51	IMAGE-OI INI

Spawn MIRA process 407 M Provided by JMMC

OImaging: Input panel



Data selection

Algorithm parameters

The screenshot displays the OImaging software interface, divided into two main sections: the input panel on the left and the data visualization on the right.

Input Panel (Left):

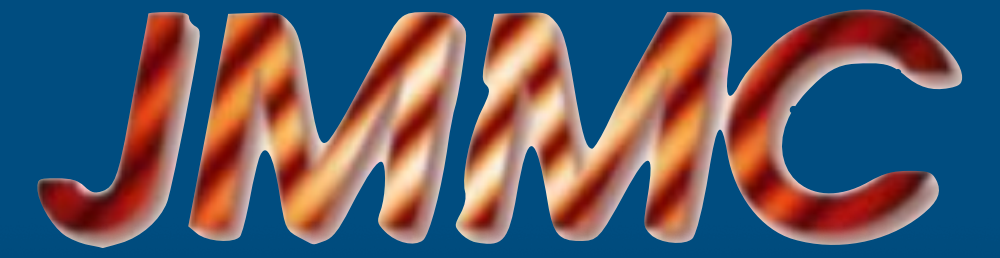
- Data selection:** Includes a file loader, a target dropdown set to "Mysterious_Obj1", and a file path "c_imaging_contest1.fits". It features sliders for "WAVE_MIN" (1.97273) and "WAVE_MAX" (2.42727), and dropdowns for "VIS" (ALL) and "T3" (ALL). A "VIS2" checkbox is checked.
- Algorithm settings:** Shows "WISARD" as the algorithm, an "INIT_IMG" field with a "Create image" button, and a "[No Image]" dropdown. Other parameters include "MAXITER" (50), "RGL_NAME" (L1L2WHITE), "RGL_WGT" (1.0E-04), and "FLUXERR" (0.01). A "View" section has a radio button for "INIT_IMG" and a "Specific parameters" field for "DELTA" (1.0). A "Manual options" section is currently empty.
- Action panel:** Contains a "Run" button and a red error message: "INIT_IMG is mandatory".

Data Visualization (Right):

- Header:** "VLTI - GRAVITY [1.9727 μm - 2.4273 μm] - A0-B2-C1-D0 / A0-G1-J2-J3 / A0-G1-J2-K0", "Day: 2022-01-18 - Source: Mysterious_Obj1".
- Plot:** A scatter plot of "VCOORD_SPATIAL (M λ - 10 6 /rad)" vs "UCOORD_SPATIAL (M λ - 10 6 /rad)". The plot shows a complex, multi-lobed pattern of data points, with each point represented by a small cluster of colored dots. The axes range from -70 to 70.
- Color Bar:** A horizontal color bar at the bottom of the plot, ranging from 1.98 to 2.42, with a color gradient from purple to red.
- Infos:** A control bar at the bottom right with buttons for "A", "D", "F", "Show", "VCOORD_SPATIAL vs UC...", "Color by", "effectiv...", "Skip Flagged" (checked), "Draw lines", and "Expr editor".

Footer: "loading file: /var/folders/jr/b6cg72m54_s93_k8fnl_wsmm0000gn/T/c_imaging_contest1.fits" and "103 M Provided by JMMC".

OImaging: Initial image



Set the field of view and the sampling of the reconstruction

- Can be a
- FITS image
 - Image from model fitting algorithms
 - built from OImaging (Gaussian)

The screenshot displays the OImaging software interface. A 'Create image' dialog box is open in the center, with the following fields and values:

- FOV (mas): 833.900
- Increments (mas): 74.919 (adjusted to: 69.492)
- Image size: 12
- FWHM (mas): 10.000
- HDU_NAME: 350

The background window shows the 'OImaging [c1]' interface with tabs for 'Input' and 'Results'. The 'Input' tab is active, displaying a 'Data Visualisation (INPUT)' plot. The plot shows a color map of the field of view with a color scale on the left ranging from 5E-5 to 1E-3. The x-axis is labeled 'ΔRA (arcsec) - [North]' and ranges from -0.45 to 0.45. The y-axis is labeled 'ΔDE (arcsec)' and ranges from -0.45 to 0.45. The plot shows a bright, elongated feature in the center. The 'Create image' dialog box has 'Cancel' and 'OK' buttons. The main window also shows various configuration options on the left, including 'TARGET' (Mysterious_Obj2), 'WAVE_MIN' (3.828), 'WAVE_MAX' (3.828), 'VIS' (NONE), 'Algorithm settings' (SPARCO), 'INIT_IMG' (-), 'MAXITER' (default-2022-07-11T14:54:41), 'RGL_NAME' (hyperbolic), 'RGL_WGT' (1.0), 'FLUXERR' (0.0), 'View' (INIT_IMG), 'Specific parameters' (RGL_TAU 1.0E-10), 'Reference wavelength [μm]' (1.0), 'Number of models' (1), 'Image spectrum' (power), 'Spectral index' (-2.0), 'Model n°1' (star), 'Flux ratio' (0.1), 'Model spectrum' (power), 'Spectral index' (-2.0), 'RA shift [mas]' (0.0), and 'DEC shift [mas]' (0.0). The bottom of the window shows 'Manual options' (-verb=1) and 'Spawn MIRA process'. The bottom right corner shows '971 M' and 'Provided by JMMC'.

OImaging

Result panel

- Image
- model
- execution log
- parameters

Input Results

Data Visualisation (RESULT)

OIFits data Images Execution log Parameters

OUTPUT1000 Set as Init Img Modify image

Id: OUTPUT1000 result#72 hdu#0

Δ RA (arcsec) - [North]

Coordinates:
RA: 00:00:00
DE: +00:00:00

Increments:
RA: 2.0E1 mas
DE: 2.0E1 mas

Image FOV:
0.8 arcsec

Pixels:
40 x 40

Δ DE (arcsec) - [East]

LUT table Earth Color scale LOGARITHMIC Display keywords Ruler

Continue
Restart
Update parameters
Save OIFits file

Index	TARGET	SOFTWARE	RGL_NAME	RGL_WGT	NITER	CHISQ	FPRIOR	SFLU0	SFLU1	Success	RATING	INIT_IMG
72	Mysterious_Obj2	BSMEM	hyperbolic	1.310E7	1000	30888.71				✓	★★★★★	OUTPUT1000-2022-07-18T23:47:17
57	Mysterious_Obj2	MIRA	hyperbolic	3000.000	1001	2.312024736817	3.147			✓	★★★★★	IMAGE-OI INITIAL IMAGE
89	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	506	2.055324225632	0.698	0.150	0.850	✓	★★★★★	IMAGE-OI INITIAL IMAGE
98	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	329	142.8914856893	0.800	0.200	0.800	✓	★★★★★	IMAGE-OI INITIAL IMAGE
94	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	334	269.5922423157	1.205	0.250	0.750	✓	★★★★★	IMAGE-OI INITIAL IMAGE
96	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	187	22492.5854826	1.936	0.100	0.900	✓	★★★★★	IMAGE-OI INITIAL IMAGE
76	Mysterious_Obj2	BSMEM		1.312E7	1000	31279.23				✓	★★★★★	OUTPUT1000-2022-07-19T14:20:59
71	Mysterious_Obj2	BSMEM		1.308E7	1000	30388.41				✓	★★★★★	OUTPUT1000-2022-07-18T23:46:54
70	Mysterious_Obj2	BSMEM		1.305E7	1000	29753.43				✓	★★★★★	OUTPUT1000-2022-07-18T23:46:43
69	Mysterious_Obj2	BSMEM		1.301E7	1000	28978.64				✓	★★★★★	OUTPUT1000-2022-07-18T23:46:31

Table editor
Compare
Delete

Spawn SPARCO process
977 M
Provided by JMMC

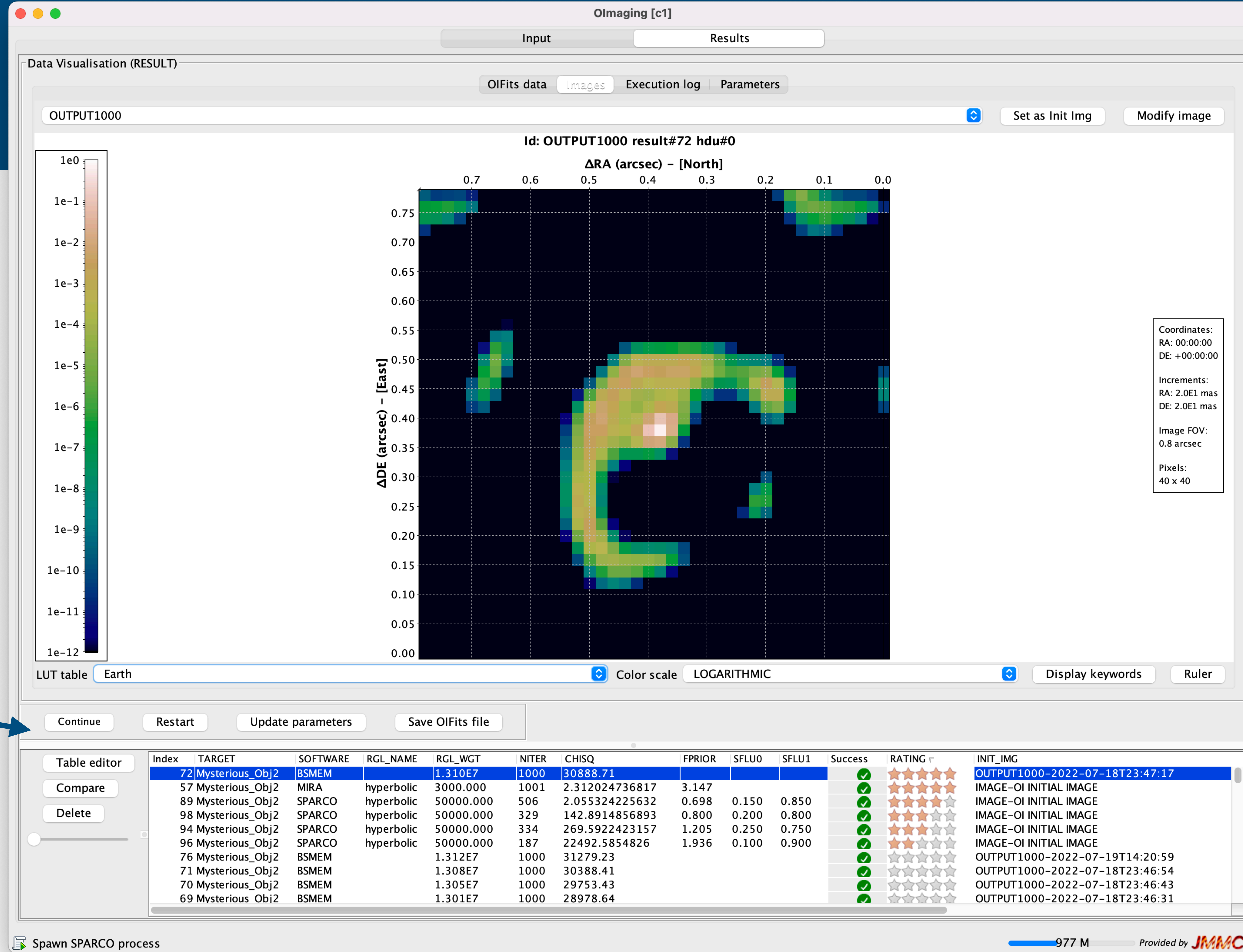
OImaging

Result panel

- Image
- model
- execution log
- parameters

Buttons

- Continue
- Restart
- Update
- Save



OImaging

Tools

- ruler
- LUT table and scale

Input Results

Data Visualisation (RESULT)
OIFits data Images Execution log Parameters

IMAGE-OI FINAL IMAGE
Set as Init Img Modify image

Id: IMAGE-OI FINAL IMAGE result#57 hdu#0

Point 1: x=-175.99998 y=60.18147
 Point 2: x=77.50939 y=-175.54739
 Measure: 346.17206 mas
 Angle: 132.91860 °

Coordinates:
 RA: 00:00:00
 DE: +00:00:00

Increments:
 RA: 1.96E1 mas
 DE: 1.96E1 mas

Image FOV:
 0.821 arcsec

Pixels:
 42 x 42

LUT table Earth
Color scale LOGARITHMIC
Display keywords Ruler

Continue Restart Update parameters Save OIFits file

Table editor

Compare

Delete

Index	TARGET	SOFTWARE	RGL_NAME	RGL_WGT	NITER	CHISQ	FPRIOR	SFLU0	SFLU1	Success	RATING	INIT_IMG
72	Mysterious_Obj2	BSMEM		1.310E7	1000	30888.71				✓	★★★★★	OUTPUT1000-2022-07-18T23:47:17
57	Mysterious_Obj2	MIRA	hyperbolic	3000.000	1001	2.312024736817	3.147			✓	★★★★★	IMAGE-OI INITIAL IMAGE
89	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	506	2.055324225632	0.698	0.150	0.850	✓	★★★★★	IMAGE-OI INITIAL IMAGE
98	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	329	142.8914856893	0.800	0.200	0.800	✓	★★★★★	IMAGE-OI INITIAL IMAGE
94	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	334	269.5922423157	1.205	0.250	0.750	✓	★★★★★	IMAGE-OI INITIAL IMAGE
96	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	187	22492.5854826	1.936	0.100	0.900	✓	★★★★★	IMAGE-OI INITIAL IMAGE
76	Mysterious_Obj2	BSMEM		1.312E7	1000	31279.23				✓	★★★★★	OUTPUT1000-2022-07-19T14:20:59
71	Mysterious_Obj2	BSMEM		1.308E7	1000	30388.41				✓	★★★★★	OUTPUT1000-2022-07-18T23:46:54
70	Mysterious_Obj2	BSMEM		1.305E7	1000	29753.43				✓	★★★★★	OUTPUT1000-2022-07-18T23:46:43
69	Mysterious_Obj2	BSMEM		1.301E7	1000	28978.64				✓	★★★★★	OUTPUT1000-2022-07-18T23:46:31

Spawn SPARCO process
691 M
Provided by **JMMC**

OImaging

Tools

- ruler
- LUT table and scale

Table panel

- All previous results
- sorting
- rating
- user notes

The screenshot displays the OImaging software interface. At the top, there are tabs for 'Input' and 'Results'. Below this, there are sub-tabs for 'OIFits data', 'Images', 'Execution log', and 'Parameters'. The main area shows a data visualization titled 'IMAGE-OI FINAL IMAGE' with a color scale on the left ranging from 1e-8 to 1e0. The plot shows a distribution of data points in a 2D space defined by ΔRA (arcsec) - [North] on the x-axis and ΔDE (arcsec) - [East] on the y-axis. A green line and a green square highlight a specific point in the data. To the right of the plot, there is a box with coordinates: RA: 00:00:00, DE: +00:00:00, Increments: RA: 1.96E1 mas, DE: 1.96E1 mas, Image FOV: 0.821 arcsec, and Pixels: 42 x 42. Below the plot, there is a 'LUT table' section with a dropdown menu set to 'Earth' and a 'Color scale' dropdown set to 'LOGARITHMIC'. At the bottom, there is a 'Table editor' section with buttons for 'Continue', 'Restart', 'Update parameters', and 'Save OIFits file'. The table itself has columns for Index, TARGET, SOFTWARE, RGL_NAME, RGL_WGT, NITER, CHISQ, FPRIOR, SFLU0, SFLU1, Success, RATING, and INIT_IMG. The table contains several rows of data, with the row for Index 57 highlighted in blue.

Point 1: $x=-175.99998$ $y=60.18147$
 Point 2: $x=77.50939$ $y=-175.54739$
 Measure: 346.17206 mas
 Angle: 132.91860 °

Index	TARGET	SOFTWARE	RGL_NAME	RGL_WGT	NITER	CHISQ	FPRIOR	SFLU0	SFLU1	Success	RATING	INIT_IMG
72	Mysterious_Obj2	BSMEM		1.310E7	1000	30888.71				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:47:17
57	Mysterious_Obj2	MIRA	hyperbolic	3000.000	1001	2.312024736817	3.147			✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
89	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	506	2.055324225632	0.698	0.150	0.850	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
98	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	329	142.8914856893	0.800	0.200	0.800	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
94	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	334	269.5922423157	1.205	0.250	0.750	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
96	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	187	22492.5854826	1.936	0.100	0.900	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
76	Mysterious_Obj2	BSMEM		1.312E7	1000	31279.23				✓	☆☆☆☆	OUTPUT1000-2022-07-19T14:20:59
71	Mysterious_Obj2	BSMEM		1.308E7	1000	30388.41				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:46:54
70	Mysterious_Obj2	BSMEM		1.305E7	1000	29753.43				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:46:43
69	Mysterious_Obj2	BSMEM		1.301E7	1000	28978.64				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:46:31

Spawn SPARCO process 691 M Provided by JMMC

OImaging

Comparing results

Input Results

OIFits data Images Execution log Parameters

Set as Init Img Modify image

IMAGE-OI FINAL IMAGE

Id: IMAGE-OI FINAL IMAGE result#94 hdu#0

Δ RA (arcsec) - [North]

Δ DE (arcsec) - [East]

Coordinates:
RA: 00:00:00
DE: +00:00:00

Increments:
RA: 1.94E1 mas
DE: 1.94E1 mas

Image FOV:
0.813 arcsec

Pixels:
42 x 42

Id: IMAGE-OI FINAL IMAGE result#98 hdu#0

Δ RA (arcsec) - [North]

Δ DE (arcsec) - [East]

Coordinates:
RA: 00:00:00
DE: +00:00:00

Increments:
RA: 1.94E1 mas
DE: 1.94E1 mas

Image FOV:
0.813 arcsec

Pixels:
42 x 42

Id: IMAGE-OI FINAL IMAGE result#89 hdu#0

Δ RA (arcsec) - [North]

Δ DE (arcsec) - [East]

Coordinates:
RA: 00:00:00
DE: +00:00:00

Increments:
RA: 1.94E1 mas
DE: 1.94E1 mas

Image FOV:
0.813 arcsec

Pixels:
42 x 42

Id: IMAGE-OI FINAL IMAGE result#96 hdu#0

Δ RA (arcsec) - [North]

Δ DE (arcsec) - [East]

Coordinates:
RA: 00:00:00
DE: +00:00:00

Increments:
RA: 1.94E1 mas
DE: 1.94E1 mas

Image FOV:
0.813 arcsec

Pixels:
42 x 42

Continue Restart Update parameters Save OIFits file

Table editor

Compare

Delete

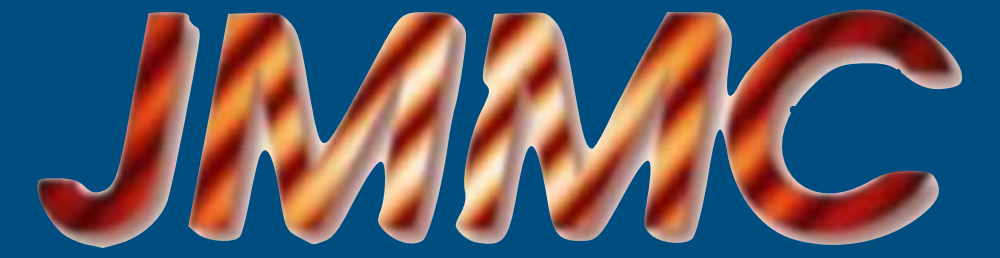
Index	TARGET	SOFTWARE	RGL_NAME	RGL_WGT	NITER	CHISQ	FPRIOR	SFLUO	SFLU1	Success	RATING	INIT_IMG
94	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	334	269.5922423157	1.205	0.250	0.750	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
98	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	329	142.8914856893	0.800	0.200	0.800	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
89	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	506	2.055324225632	0.698	0.150	0.850	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
96	Mysterious_Obj2	SPARCO	hyperbolic	50000.000	187	22492.5854826	1.936	0.100	0.900	✓	☆☆☆☆	IMAGE-OI INITIAL IMAGE
76	Mysterious_Obj2	BSMEM		1.312E7	1000	31279.23				✓	☆☆☆☆	OUTPUT1000-2022-07-19T14:20:59
72	Mysterious_Obj2	BSMEM		1.310E7	1000	30888.71				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:47:17
71	Mysterious_Obj2	BSMEM		1.308E7	1000	30388.41				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:46:54
70	Mysterious_Obj2	BSMEM		1.305E7	1000	29753.43				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:46:43
69	Mysterious_Obj2	BSMEM		1.301E7	1000	28978.64				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:46:31
68	Mysterious_Obj2	BSMEM		1.296E7	1000	28048.35				✓	☆☆☆☆	OUTPUT1000-2022-07-18T23:46:20

Spawn SPARCO process

1247 M

Provided by **JMMC**

You'll never walk alone



Subpages:

Overview VLTI Expertise Centre Support

VLTI Expertise Centres

Structured development of optical interferometry requires leaping towards a European network of VLTI Expertise Centres. These centres are the backbone of dissemination activities to new VLTI users, by organising observing preparation and **data reduction schools**, by co-organising with ESO VLTI open days, and being the end-points of the **Fizeau staff exchange programme**.

The leap aims at bringing the impact and return of the programme in spreading know-how in Europe to a new level. It follows at a smaller scale the successful experience of the ALMA Regional Centres, where researchers travel to the expertise centres to reduce their data. The centres will be the visible first contact point for astronomers interested in using VLTI.

The present network of VLTI Expertise Centres includes three partners from the OPTICON Horizon 2020 networking activity:

- **Jean-Marie Mariotti Centre (JMMC) - Service aux Utilisateurs du VLTI**, (SUV) France - a structure that aggregates manpower from different observatories:
 - **Observatoire des Sciences de l'Univers de Grenoble (OSUG)**
 - **Observatoire des Sciences de l'Univers de Lyon (OSUL)**
 - **Observatoire de Paris-Meudon (OPM)**
 - **Observatoire de la Côte d'Azur (OCA)**
- **Portuguese VLTI Expertise Centre**, Portugal
- **University of Exeter**, United Kingdom

two interferometry JRA (Joint Research Activities; WP8) lead partners:

- **Lagrange Laboratory/OCA**, France
- **KU Leuven**, Belgium

and two new nodes from the **OPTICON/RadioNet Pilot (ORP)** program:

- **Leiden Observatory**, The Netherlands
- **Konkoly Observatory**, Hungary

An overview of the support provided by each VLTI Expertise Centre and the data protection policy can be found [here](#).

Visitors wishing to travel to the above centres to reduce their VLTI data or prepare observations are encouraged to use the **Fizeau Programme**.

Welcome onto the JMMC User Feedback Form !

(* : required field)

Application:

Type:

Your Email * :

Summary * :

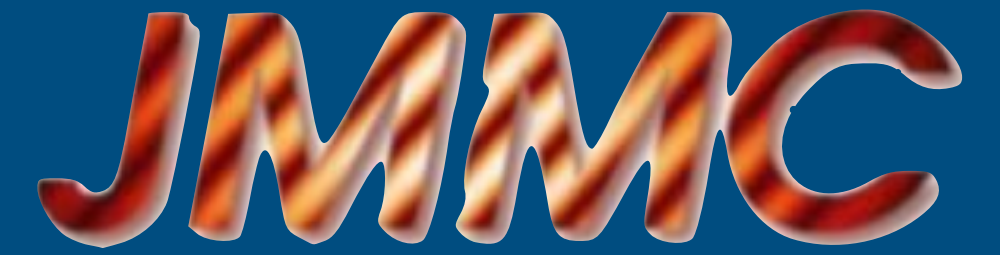
Comments * :

Version:

Effacer

Envoyer

OImaging



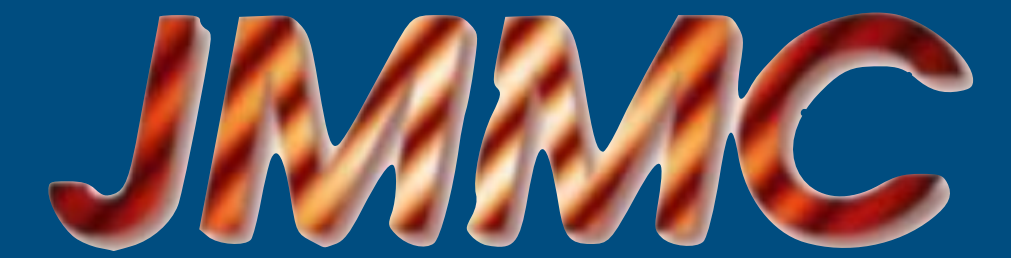
- Checkout new v1.0 release !!! www.jmmc.fr/releases/
- Still in progress
- Open source:  github.com/JMMC-OpenDev
- Need help to add new algorithms

- Checkout new v1.0 release !!! www.jmmc.fr/releases/
- Still in progress
- Open source:  github.com/JMMC-OpenDev
- Need help to add new algorithms

Ask for help and give feedback !

- Expertise center gather experts that are willing to help
- Request features
- Knowing user needs help us to tailor softwares
- Research on methodology are fueled by requests

OImaging: a collective project



© The big chiefs:

I. Tallon-Bosc
J-P. Berger
G. Duvert

© The developers:

L. Bourgès
A. Kaszczyc
G. Mella
M. Pratoussy



© The reconstruction software fathers:

G. Duvert
J. Kluska
L. Mugnier
E. Thiébaut
J. Young

© The beta-testers:

J. Kluska
M. Montargès