



CARTA

Cube Analysis and Rendering Tool for Astronomy

Next-generation image visualization and analysis tool designed for
ALMA, VLA, and SKA pathfinders





ASIAA

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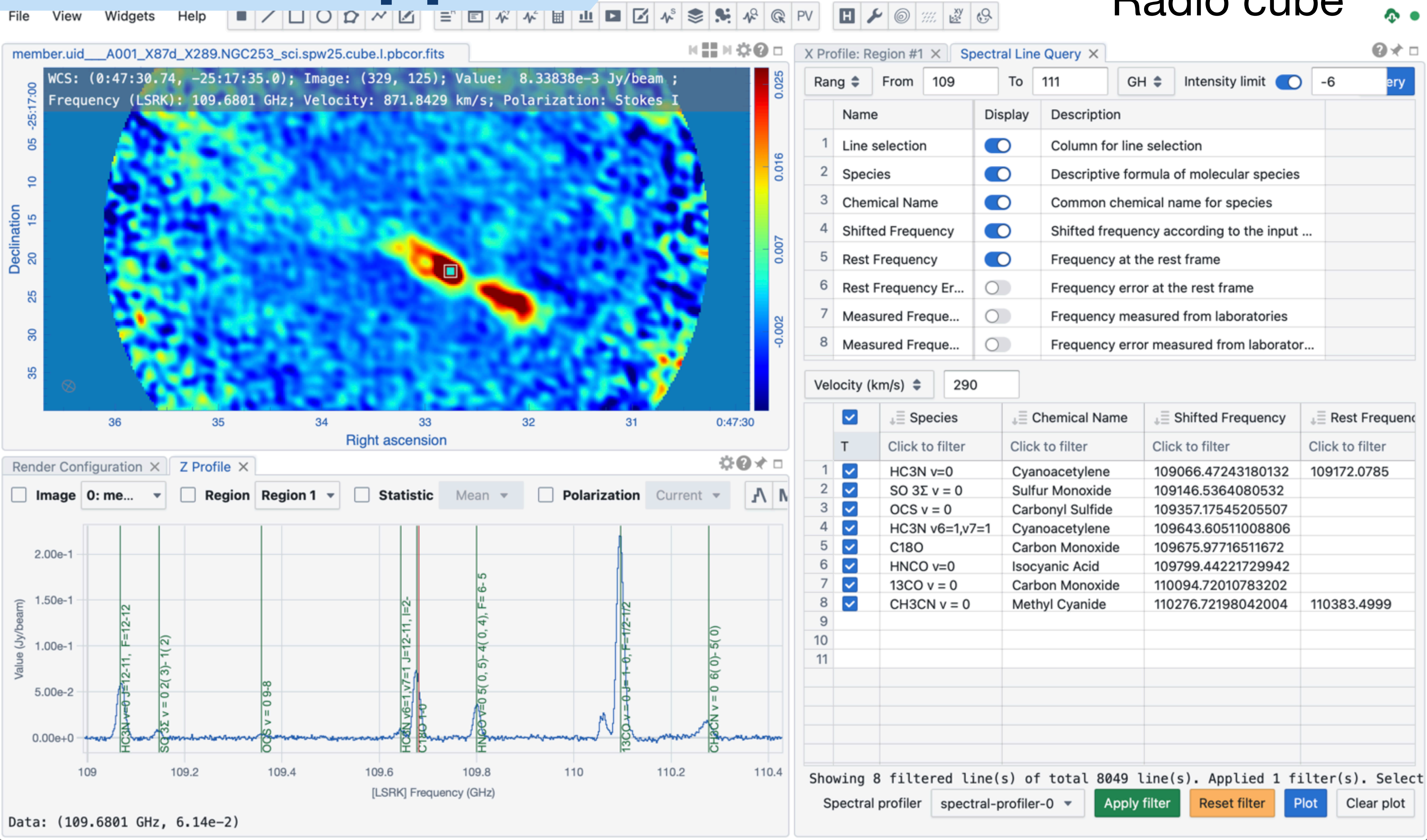
High Performance & Deployment Flexibility

- **1TB image cubes with 1,000 channels can be loaded in seconds (with ~1GB of RAM).**
- **Catalogs with 1M sources can be loaded and rendered in seconds.**
- **Stand-Alone Application (PC) & Site Deployment (server):**
MacOS, Ubuntu, RHEL, Docker

Feature Highlights

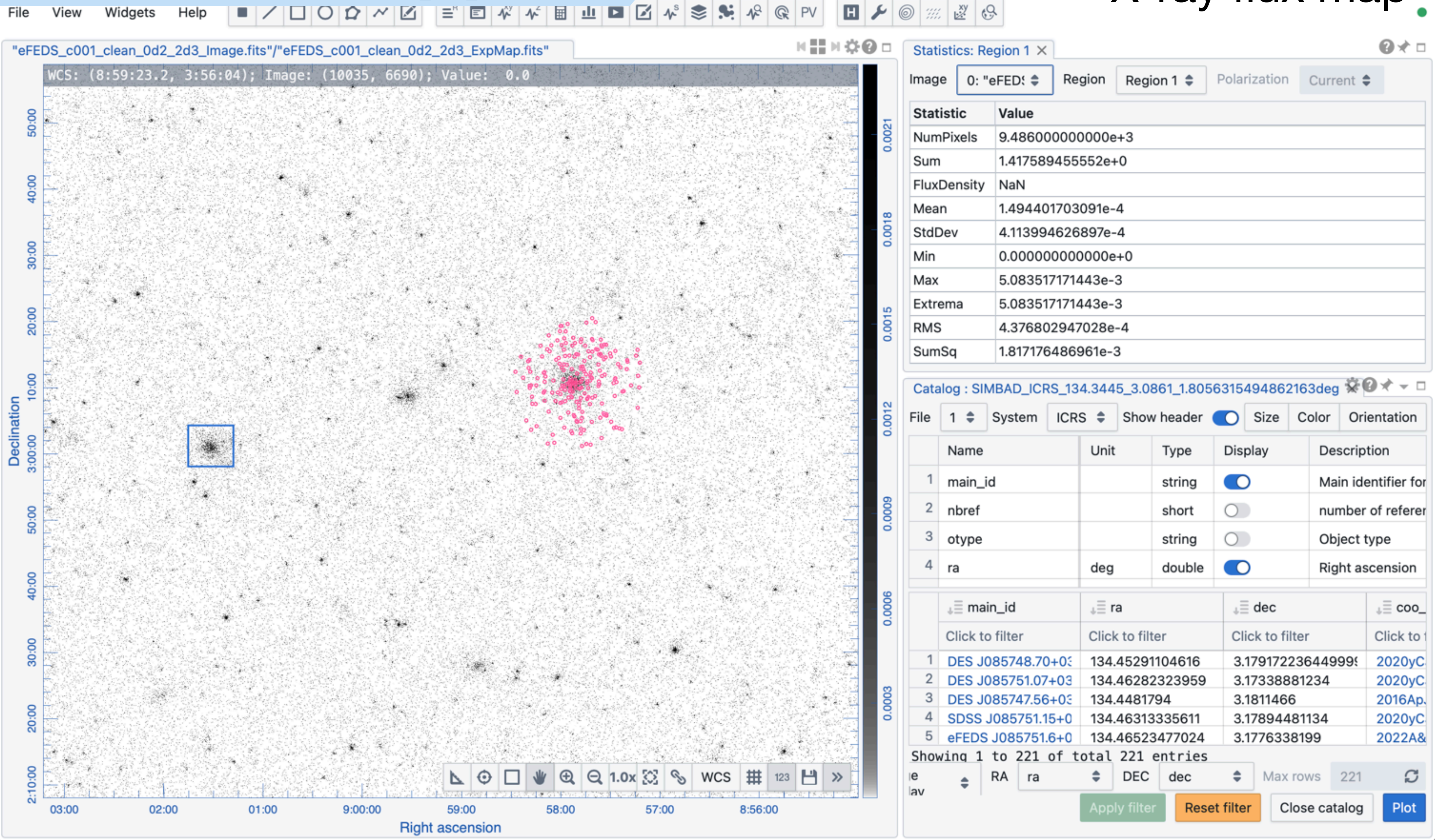
Various data support

Radio cube



Various data support

X-ray flux map



Various data support

OIR IFU

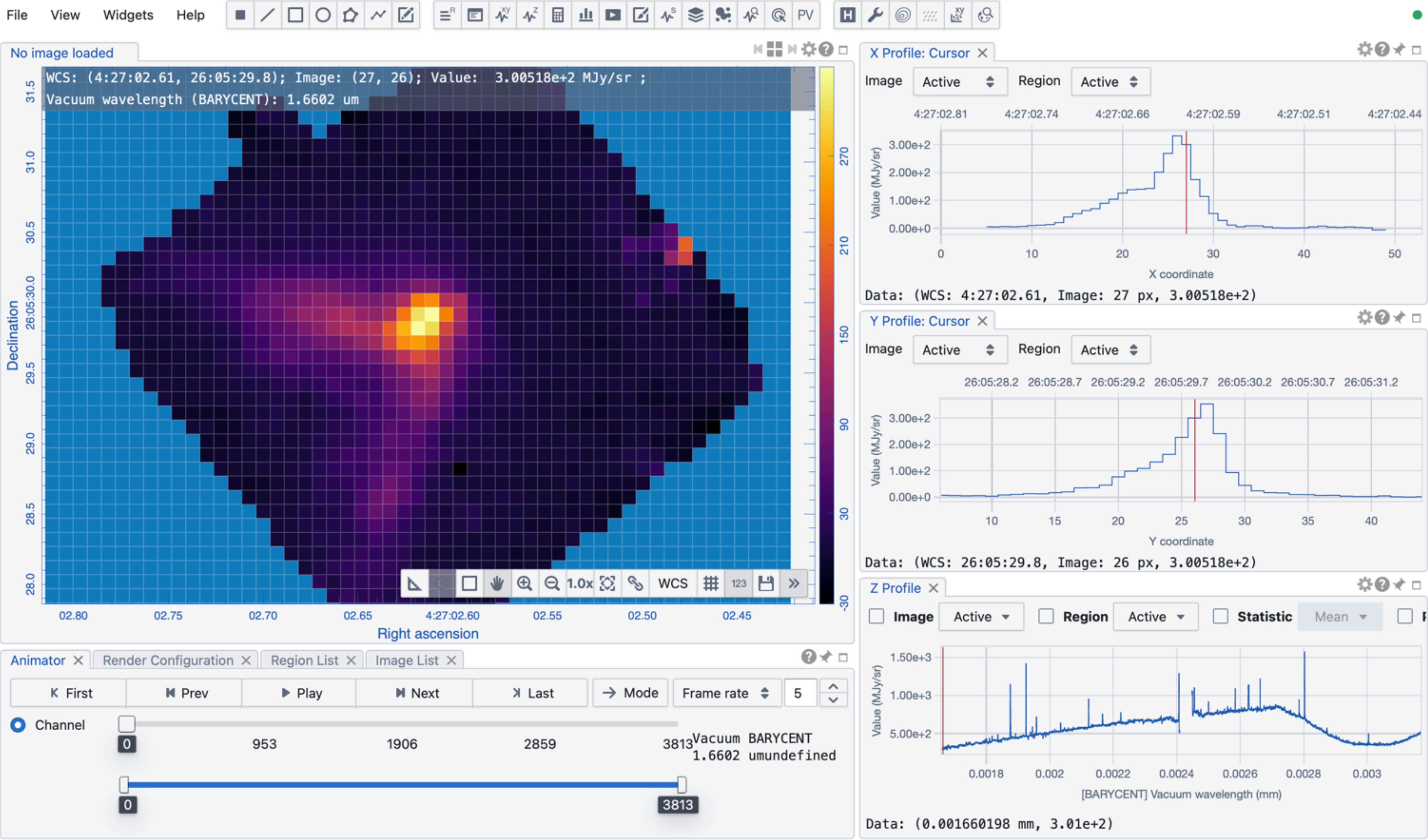
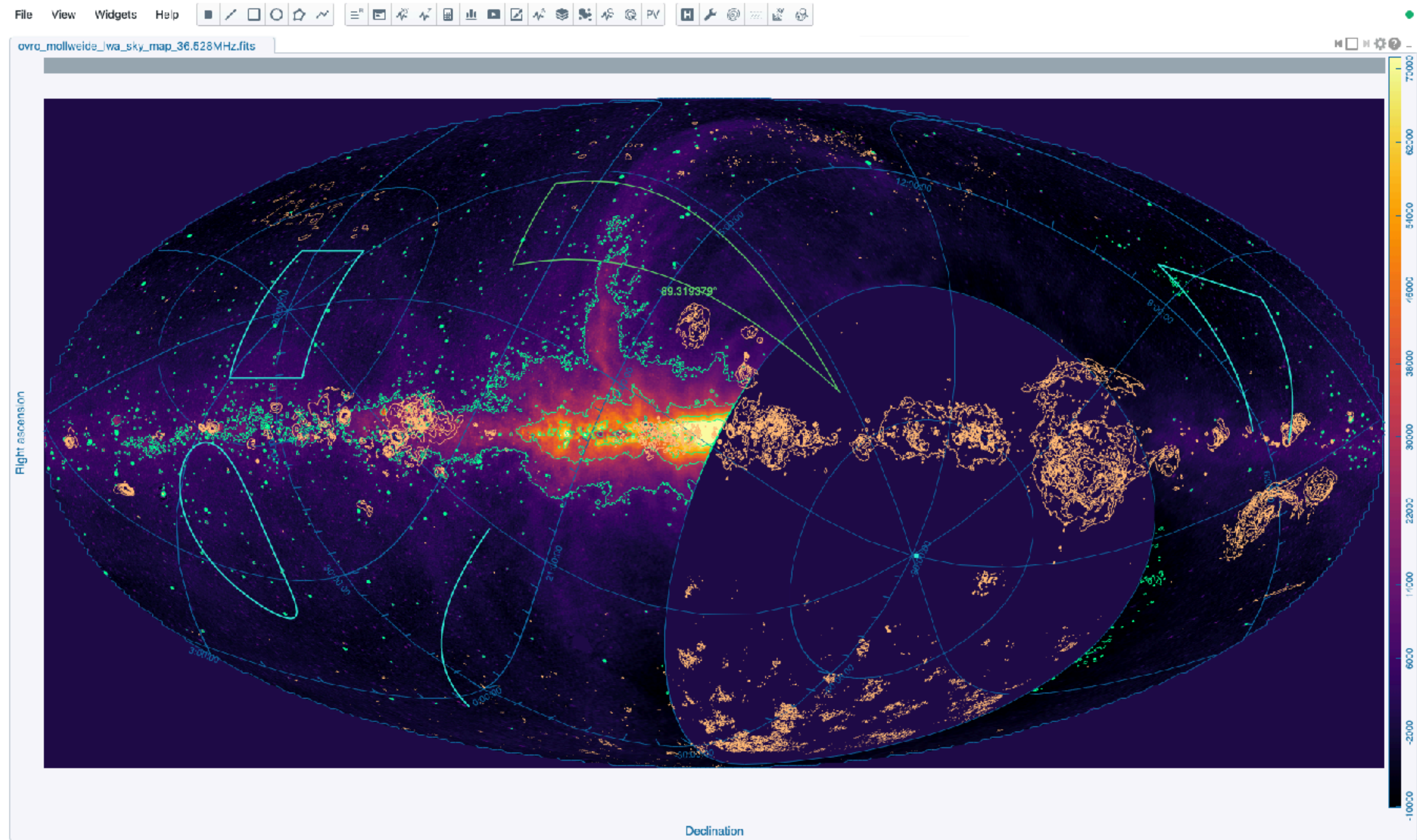


Image viewer, raster, contour, region



Vector field rendering

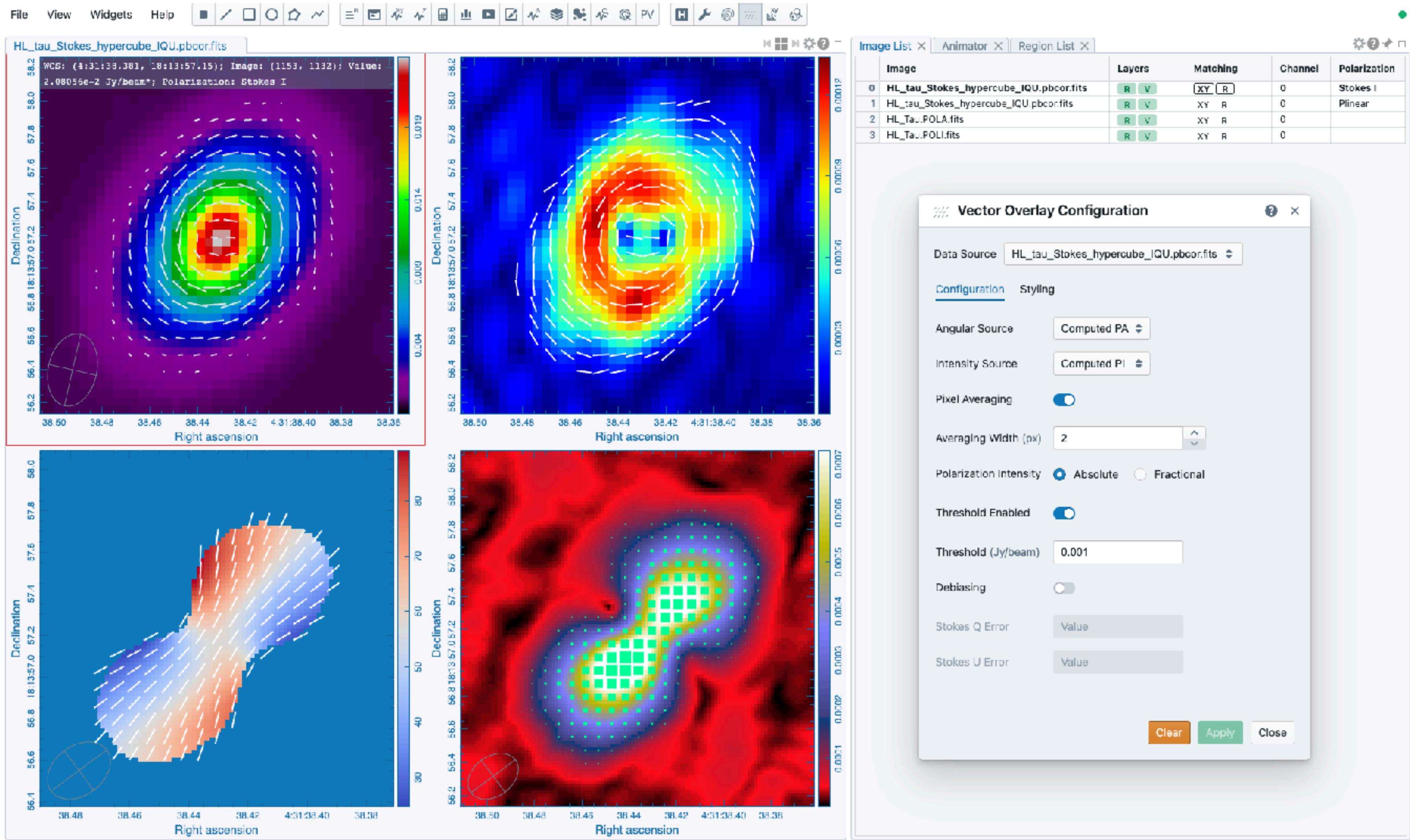
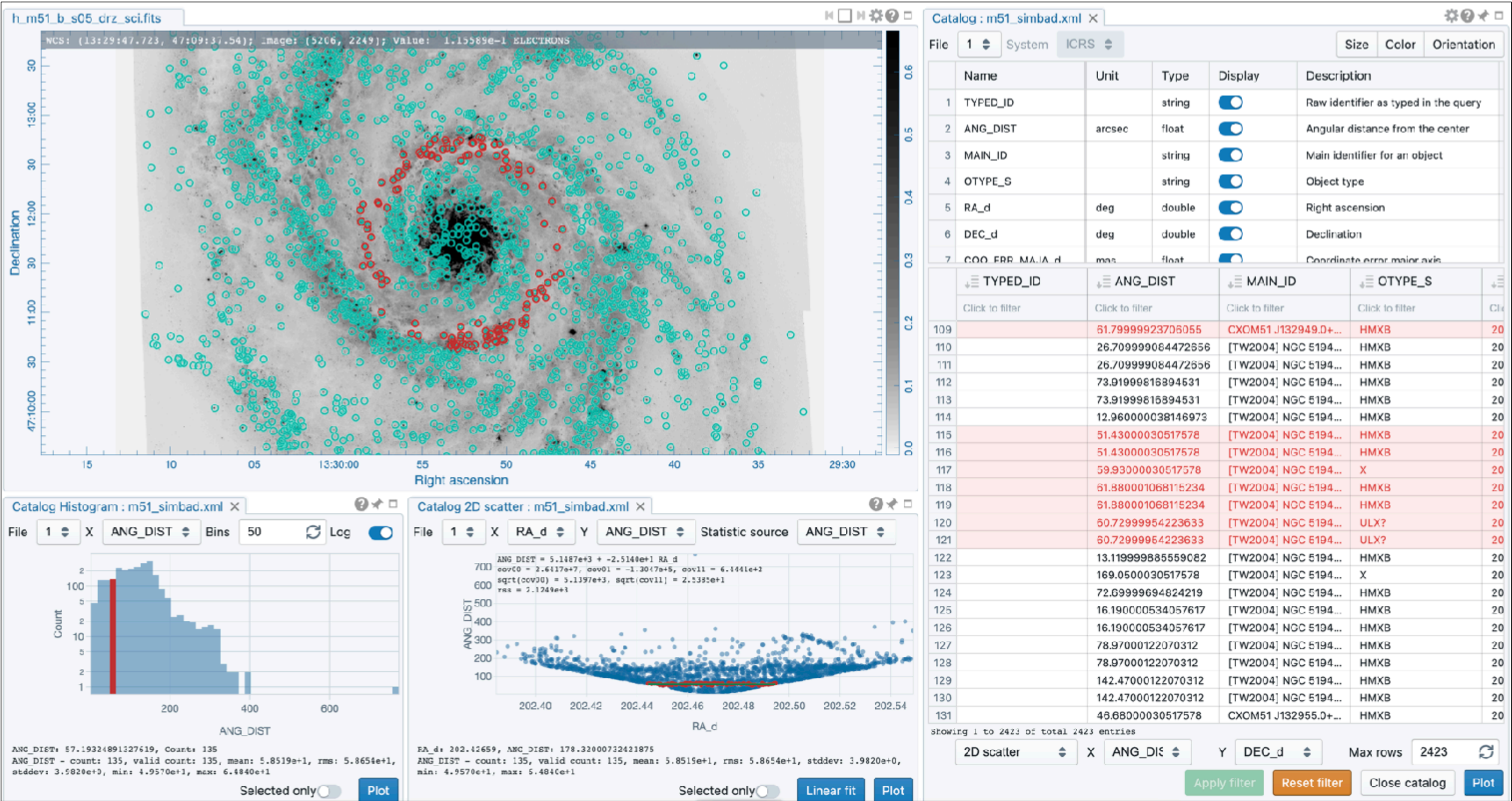


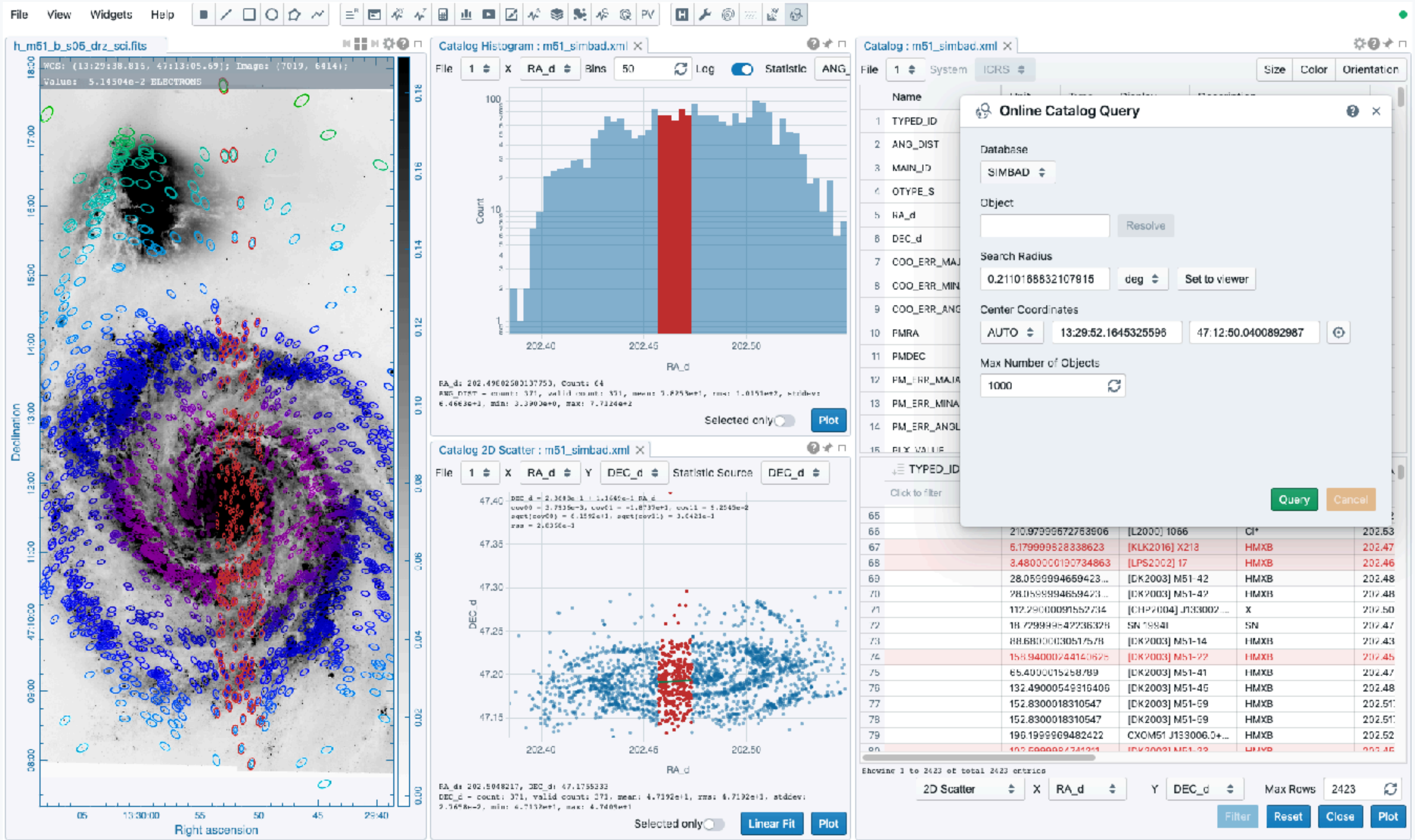
Image overlay



Intuitive image fitting tool



Catalog widget, linked visualization



Spectral line query and line ID labeling

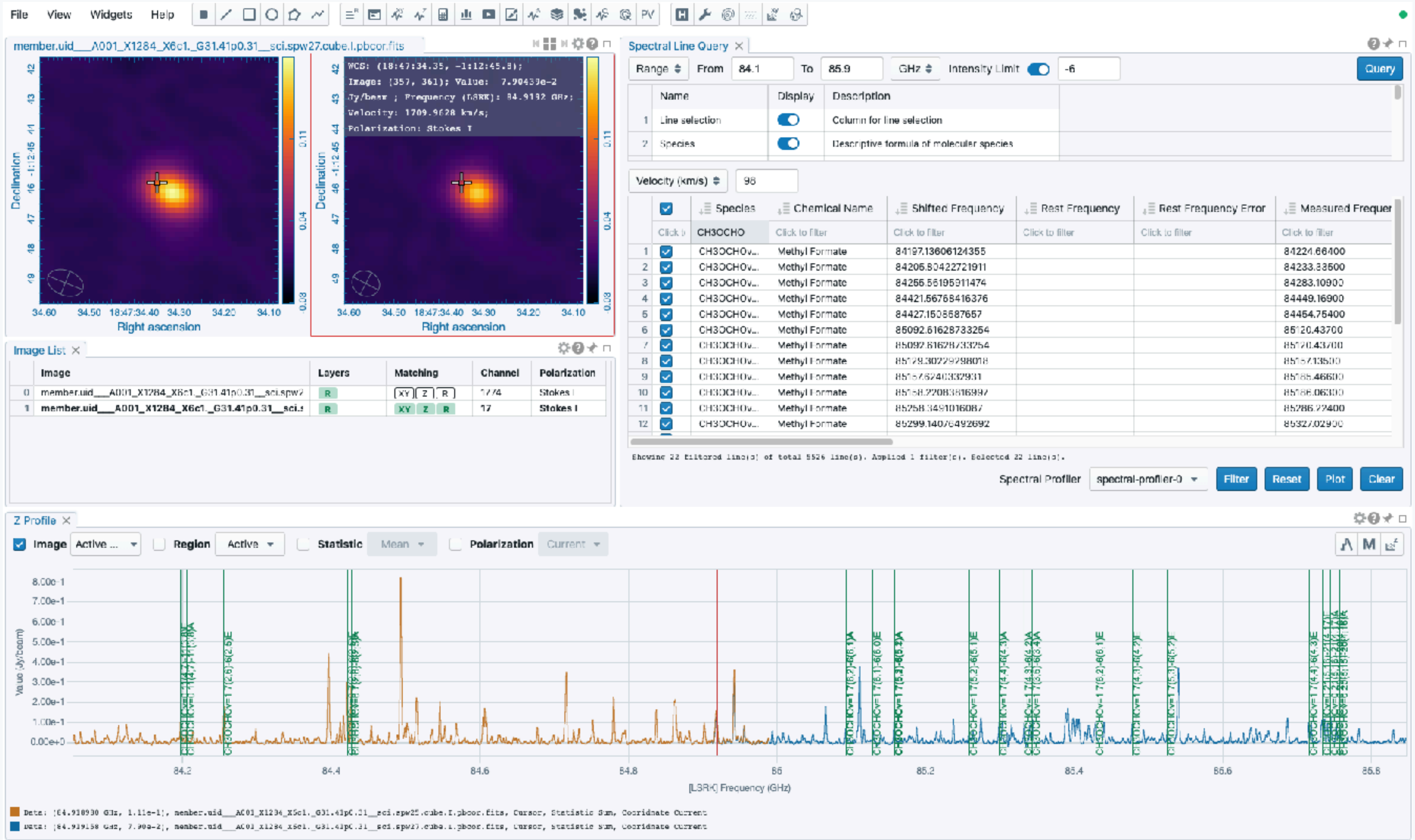
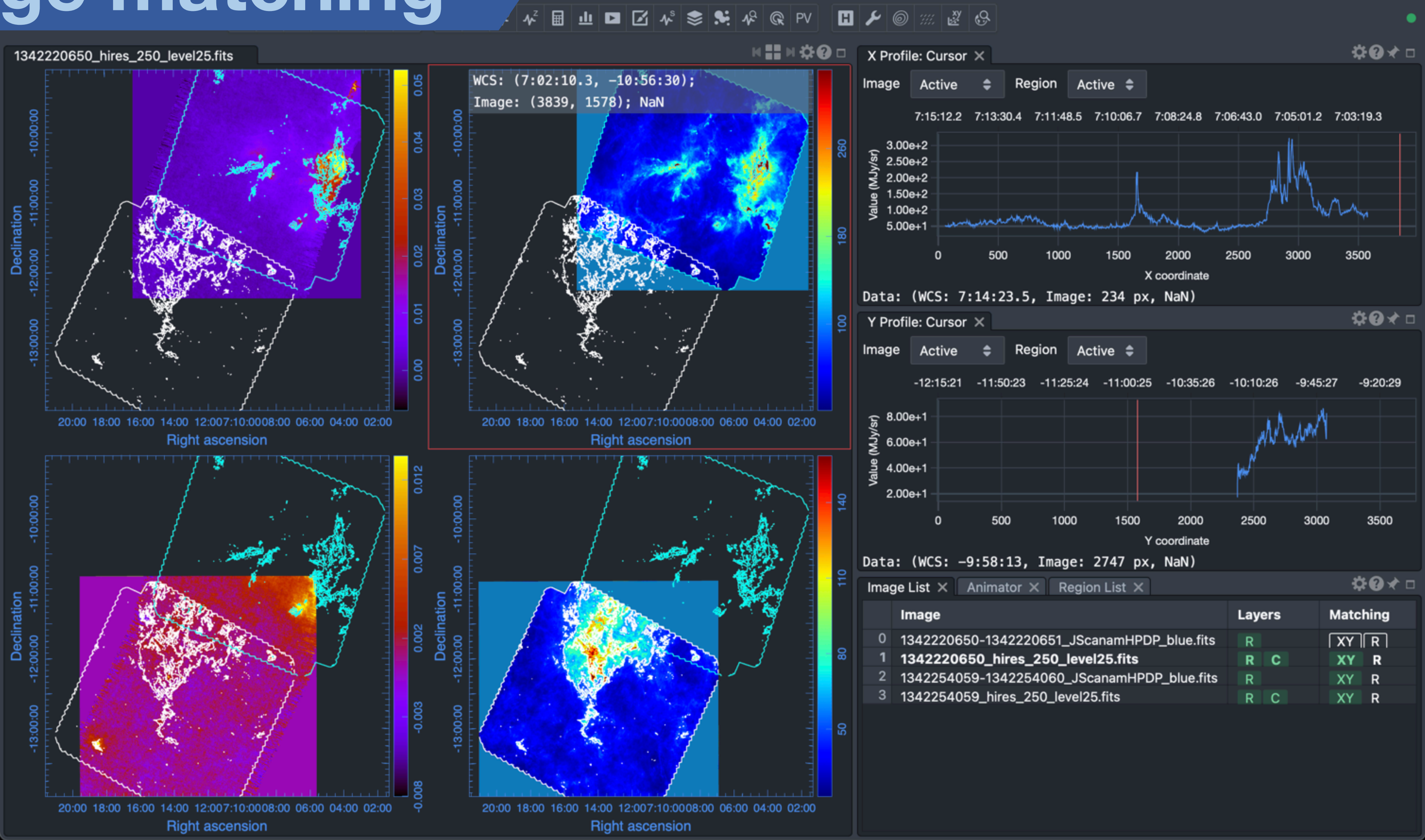
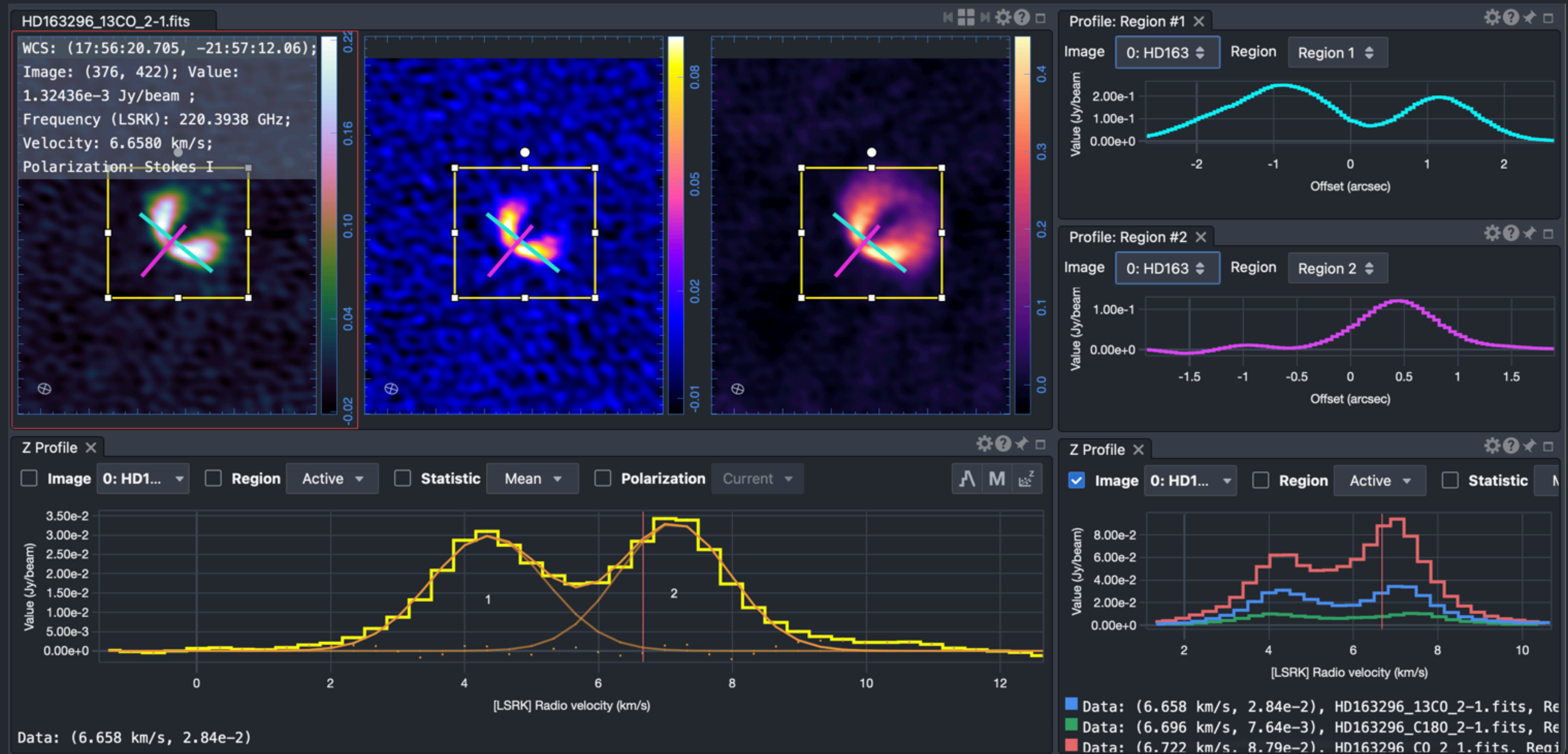


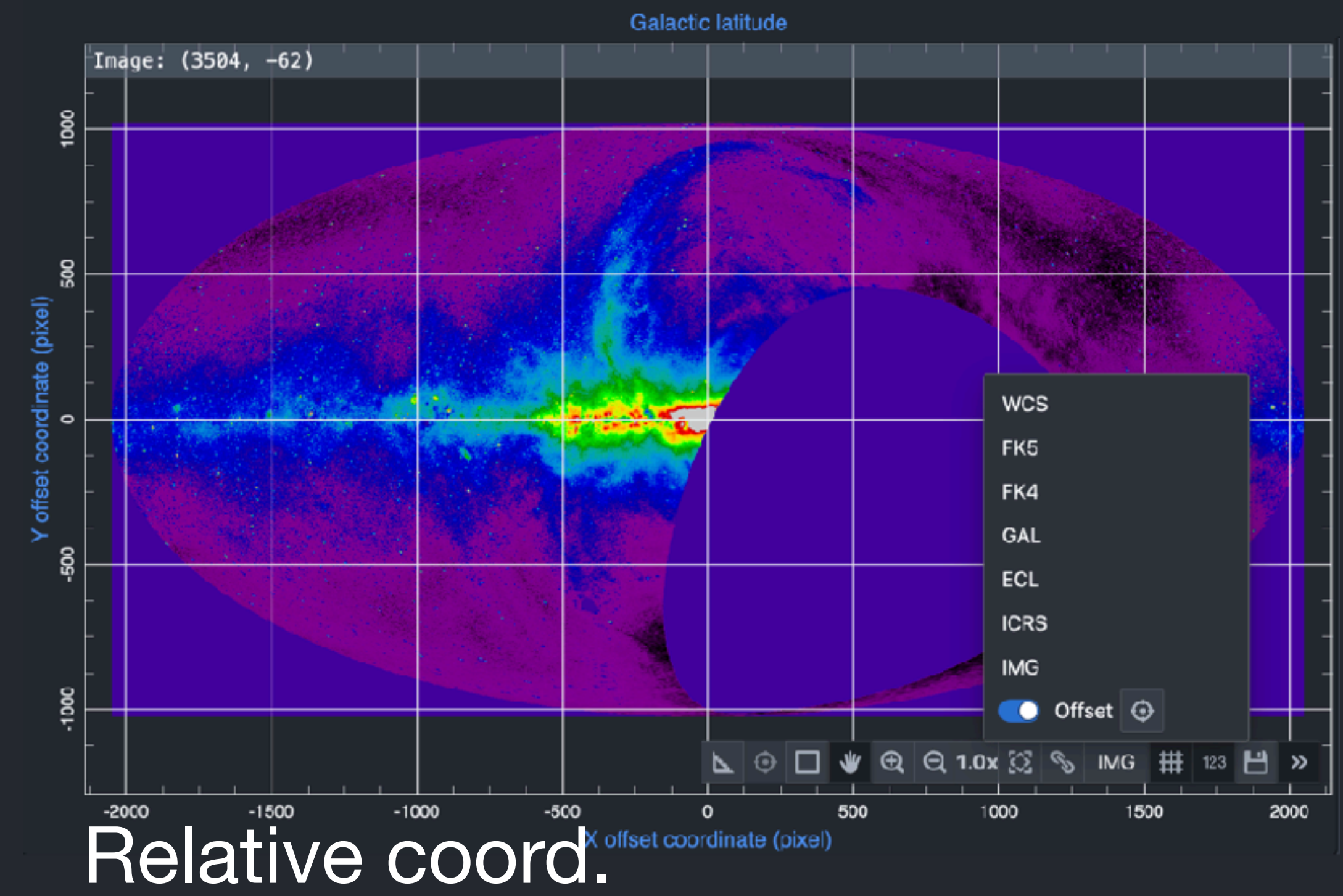
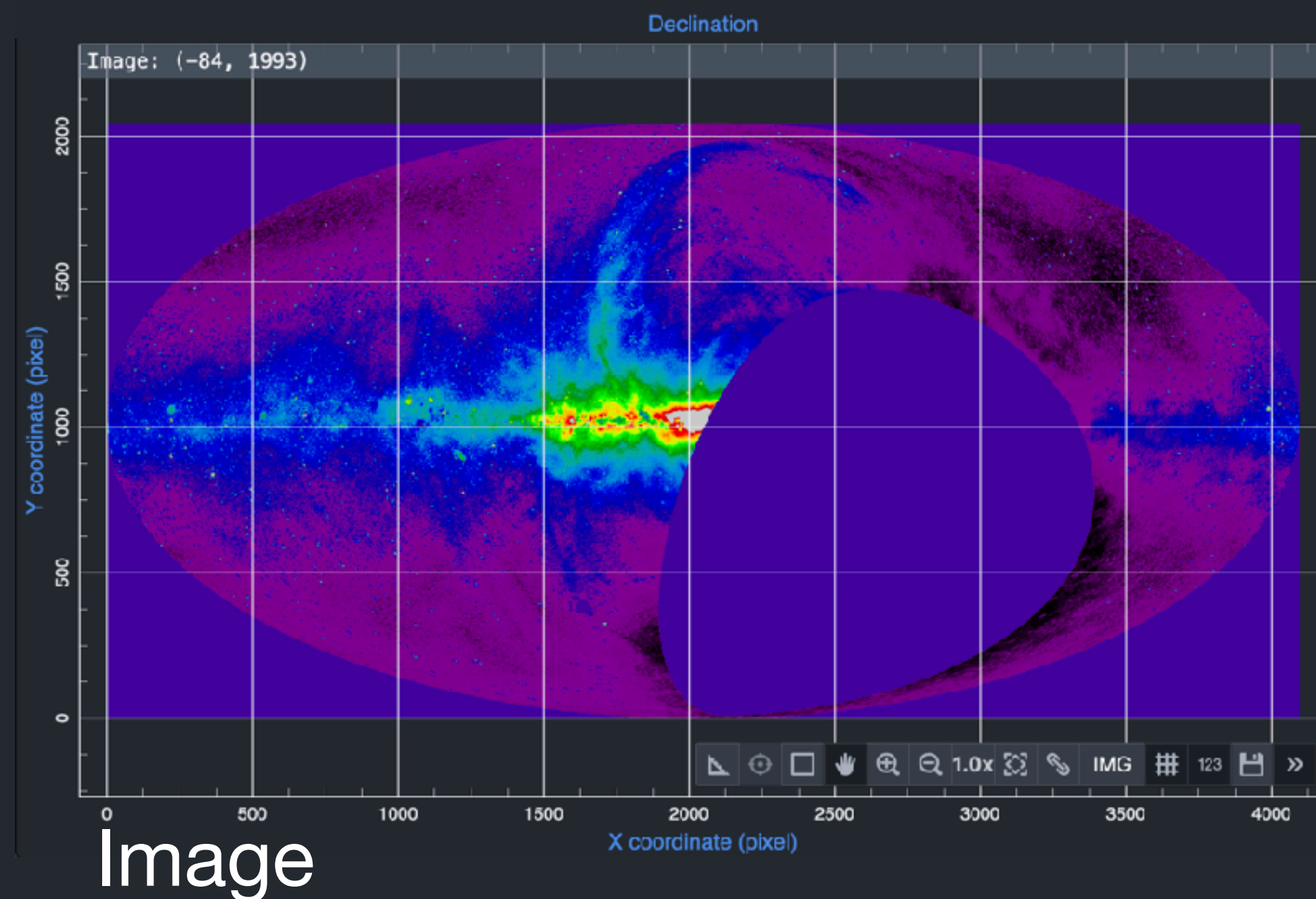
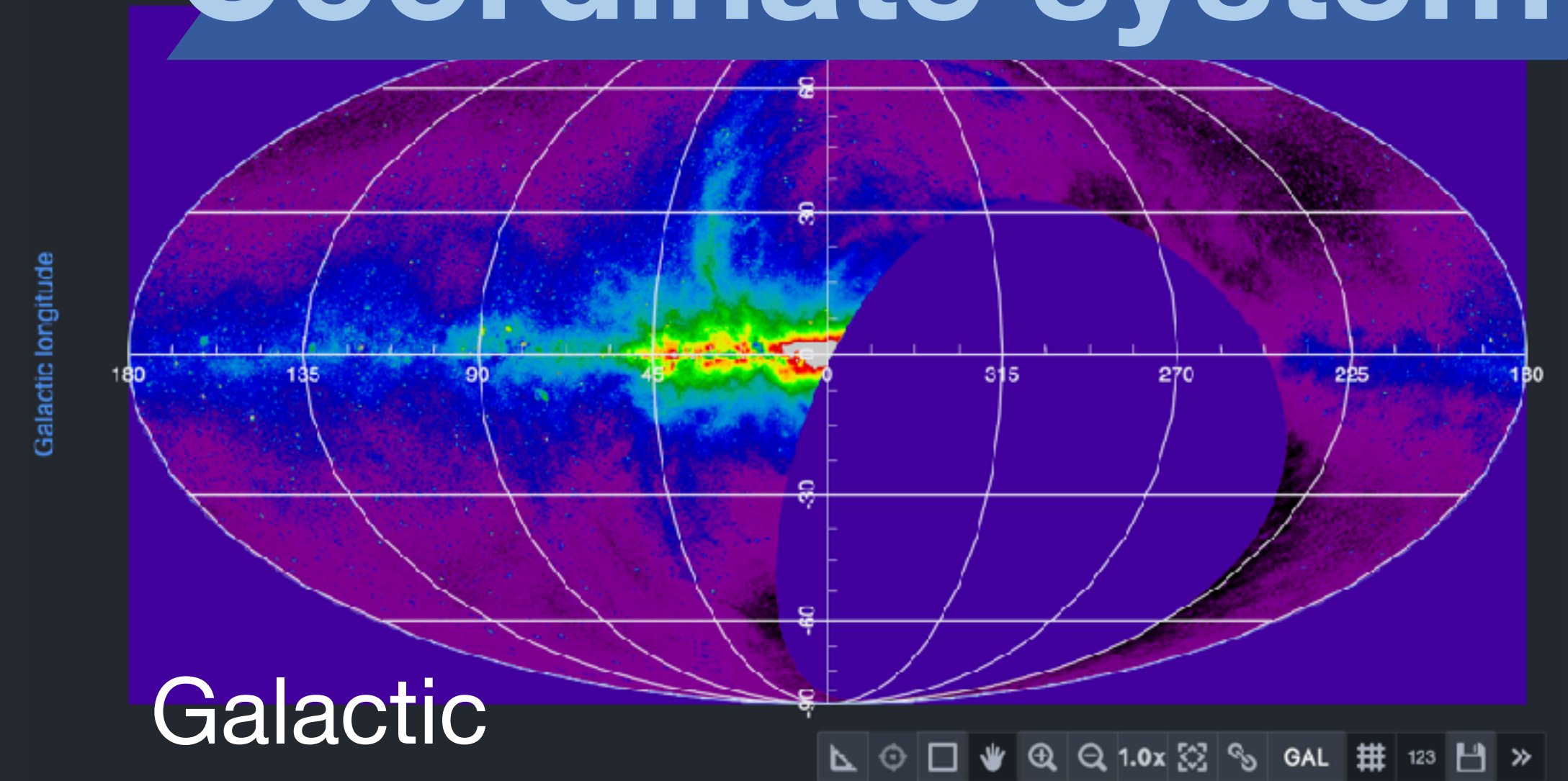
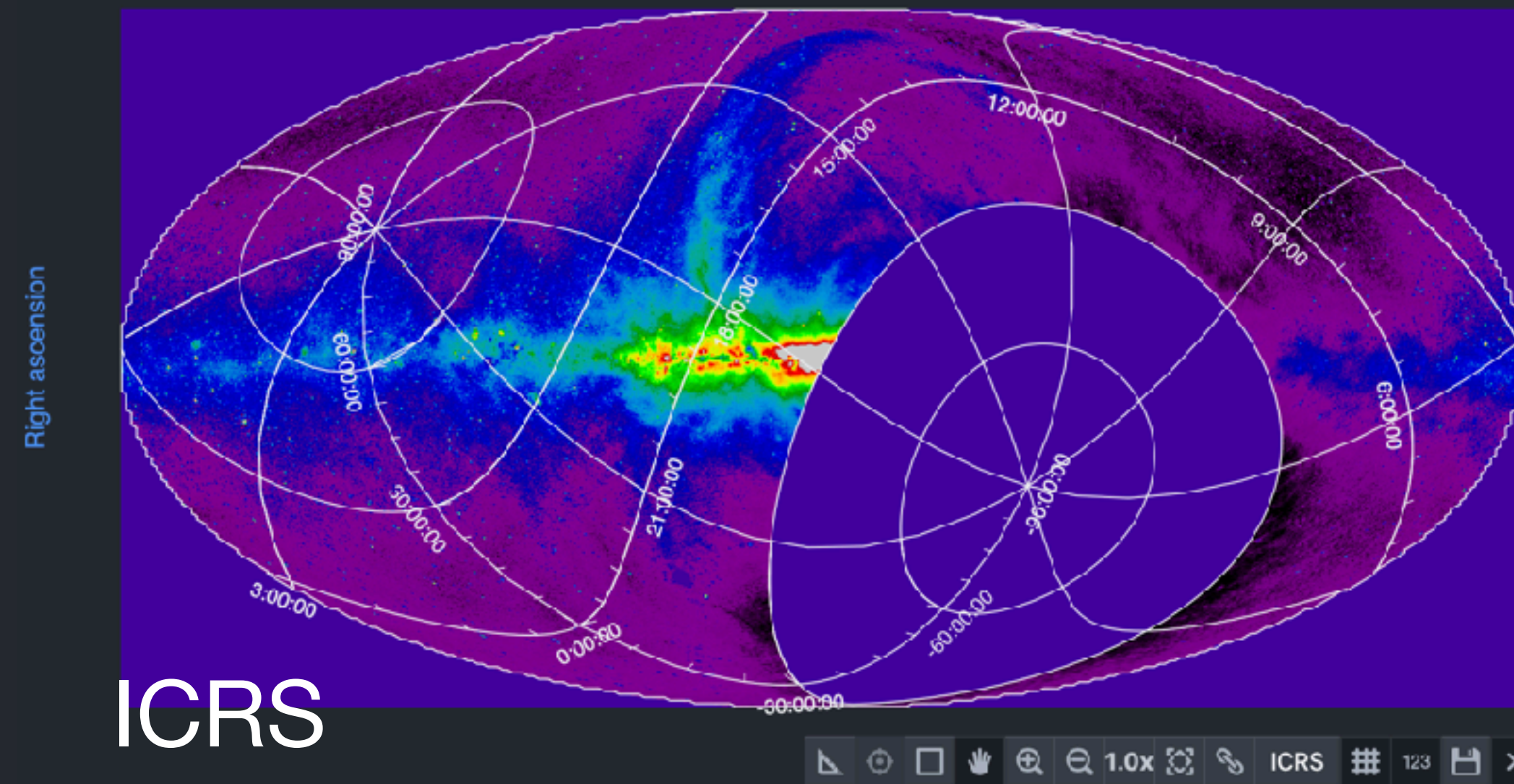
Image matching



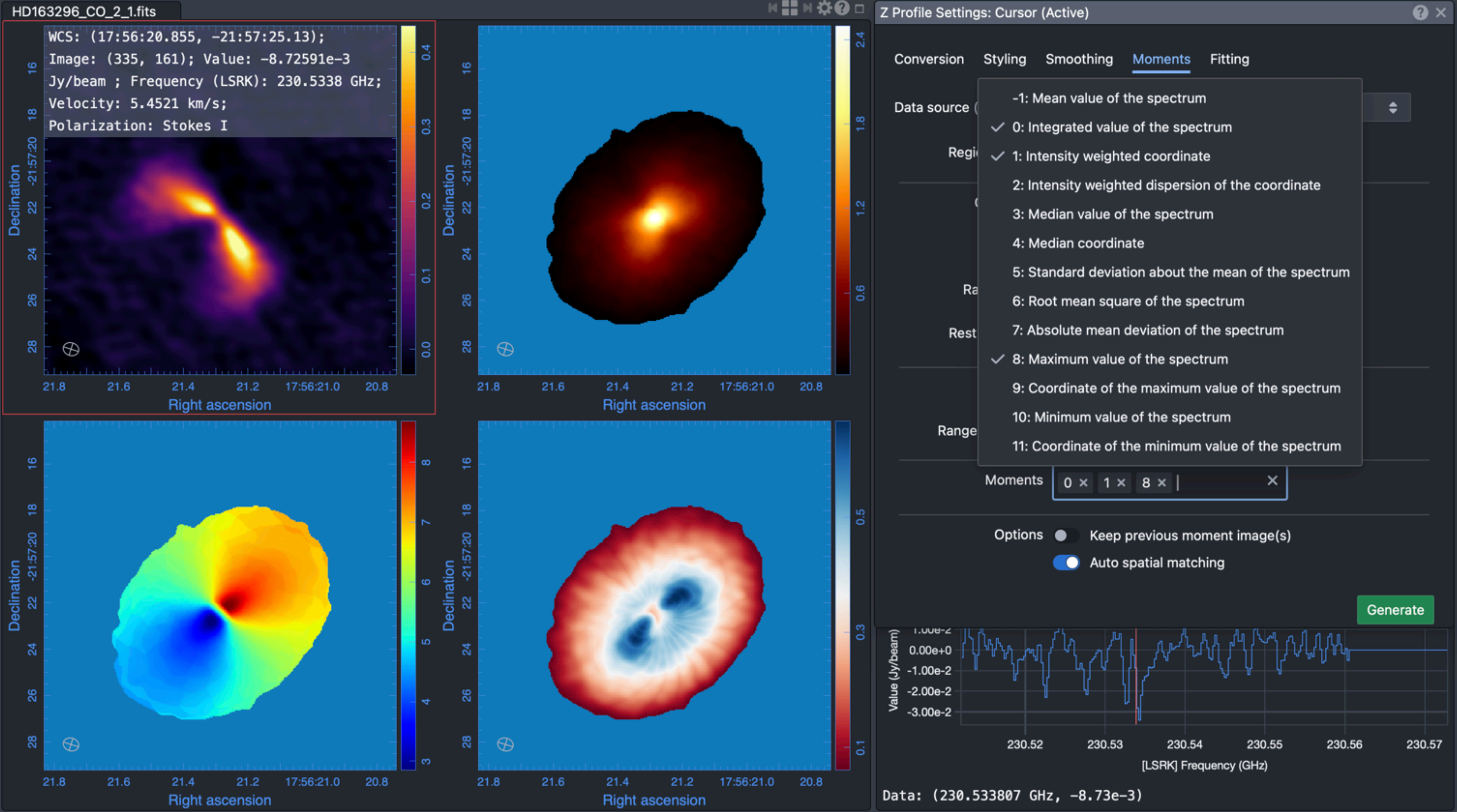
Spatial profile



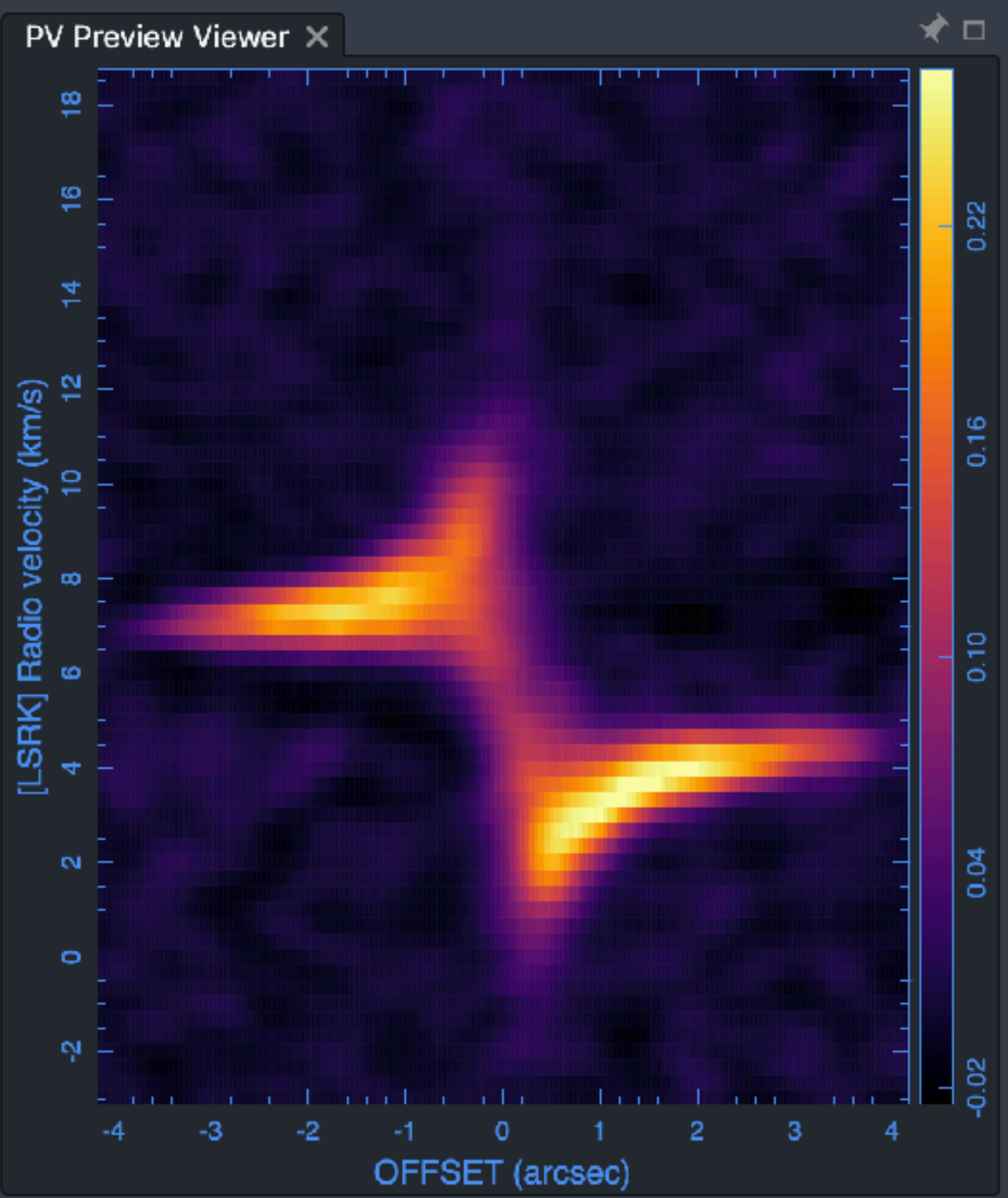
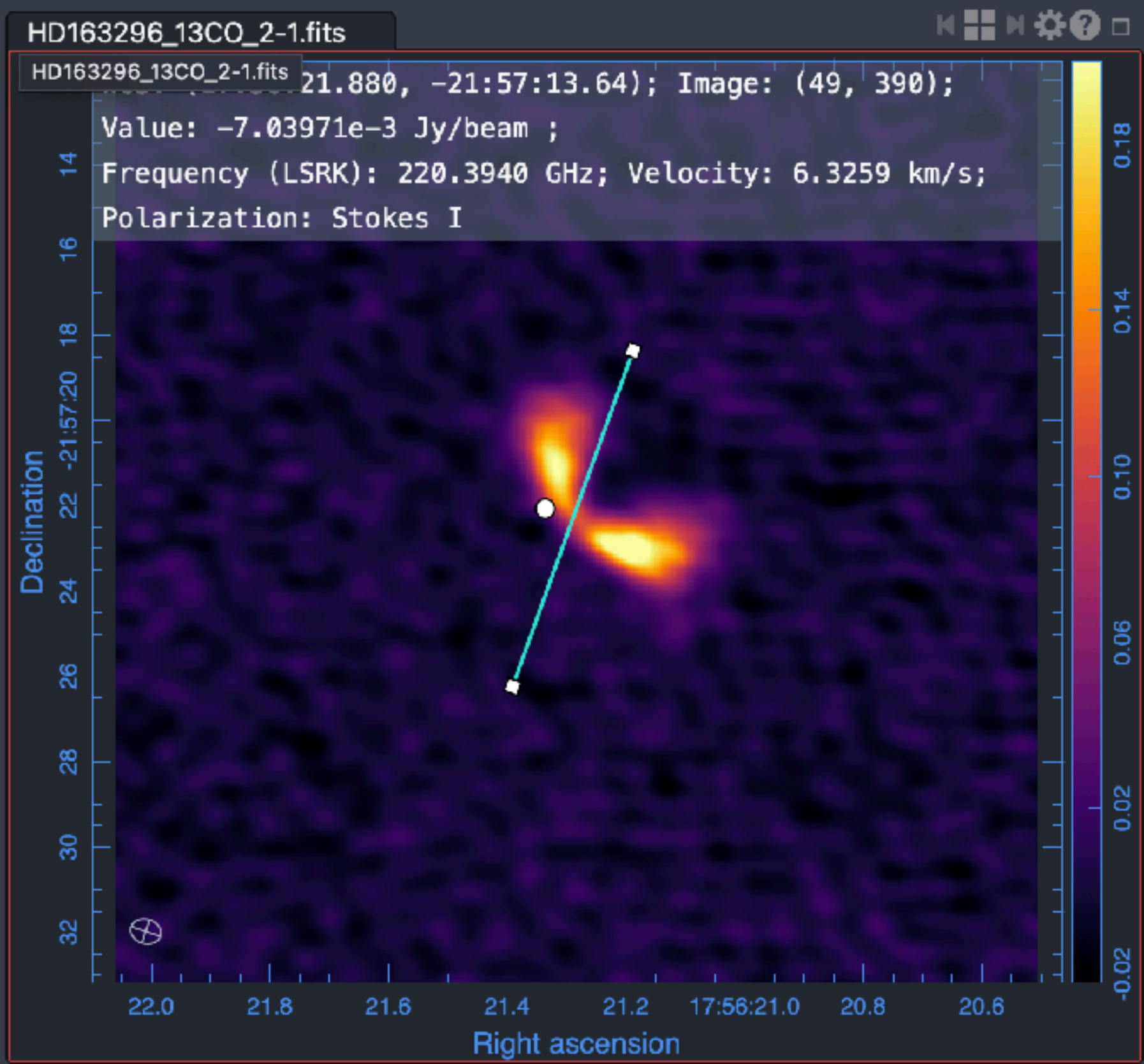
Coordinate system



Moment map



PV preview



PV Generator

Data source (0: HD1632... 0: HD163296_13CO_2-1.fits

PV cut (Region 1) Region 1

Average width 3

Coordinate Frequency (GHz)

System LSRK

Range (GHz) From 220.385 To 220.41

Axes order X-axis: Spatial, Y-axis: Spectral

Keep previous PV image(s)

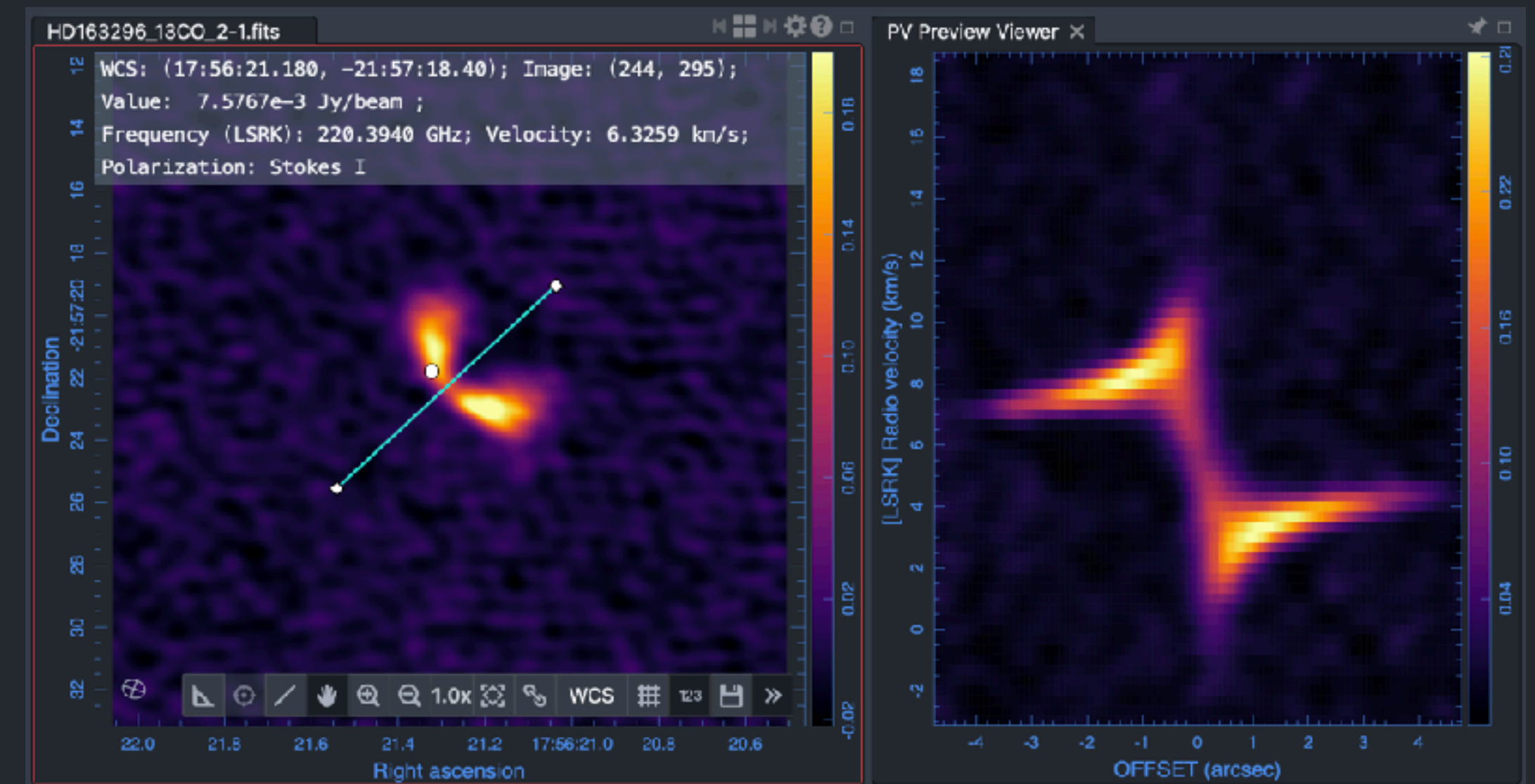
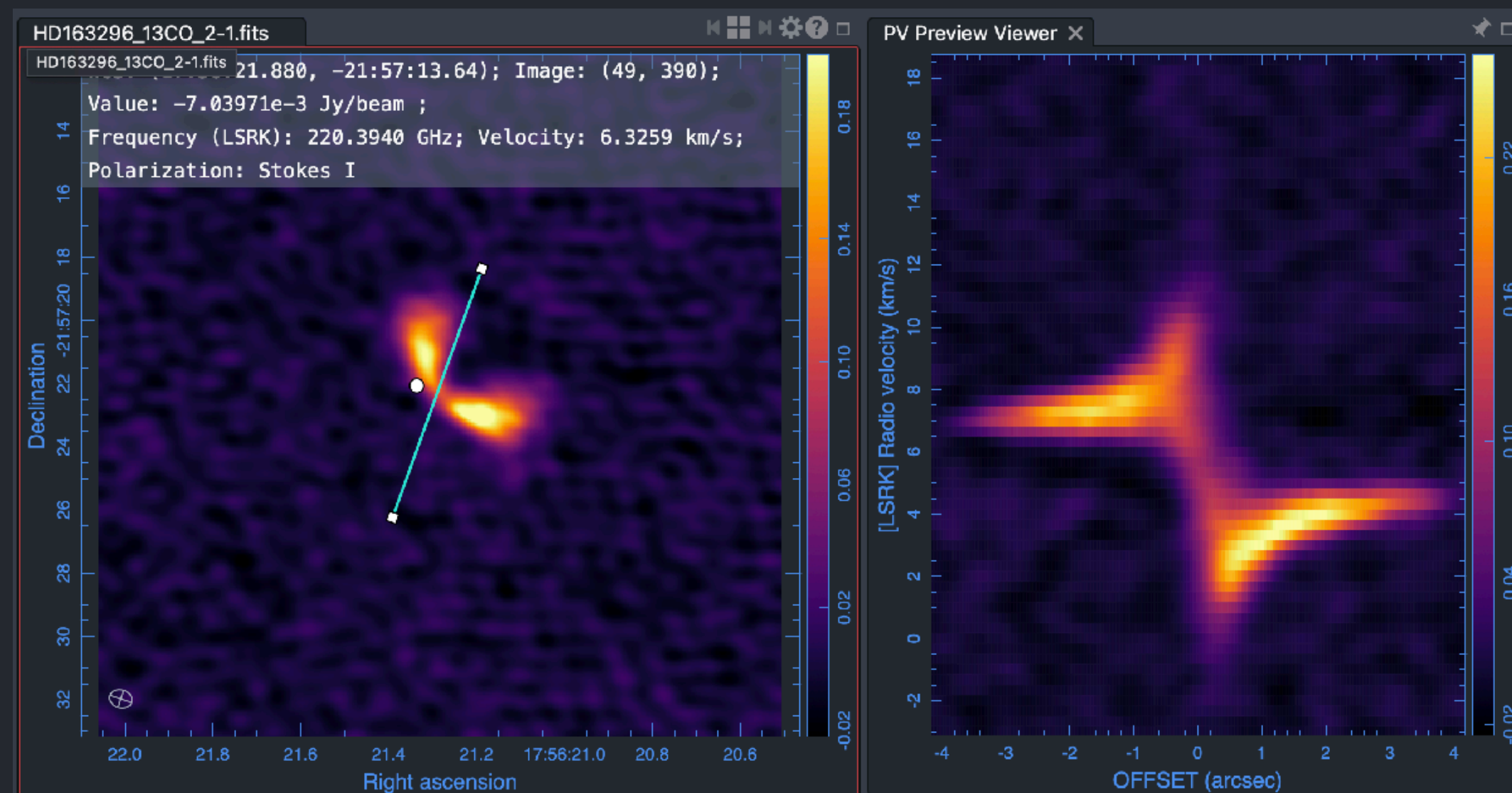
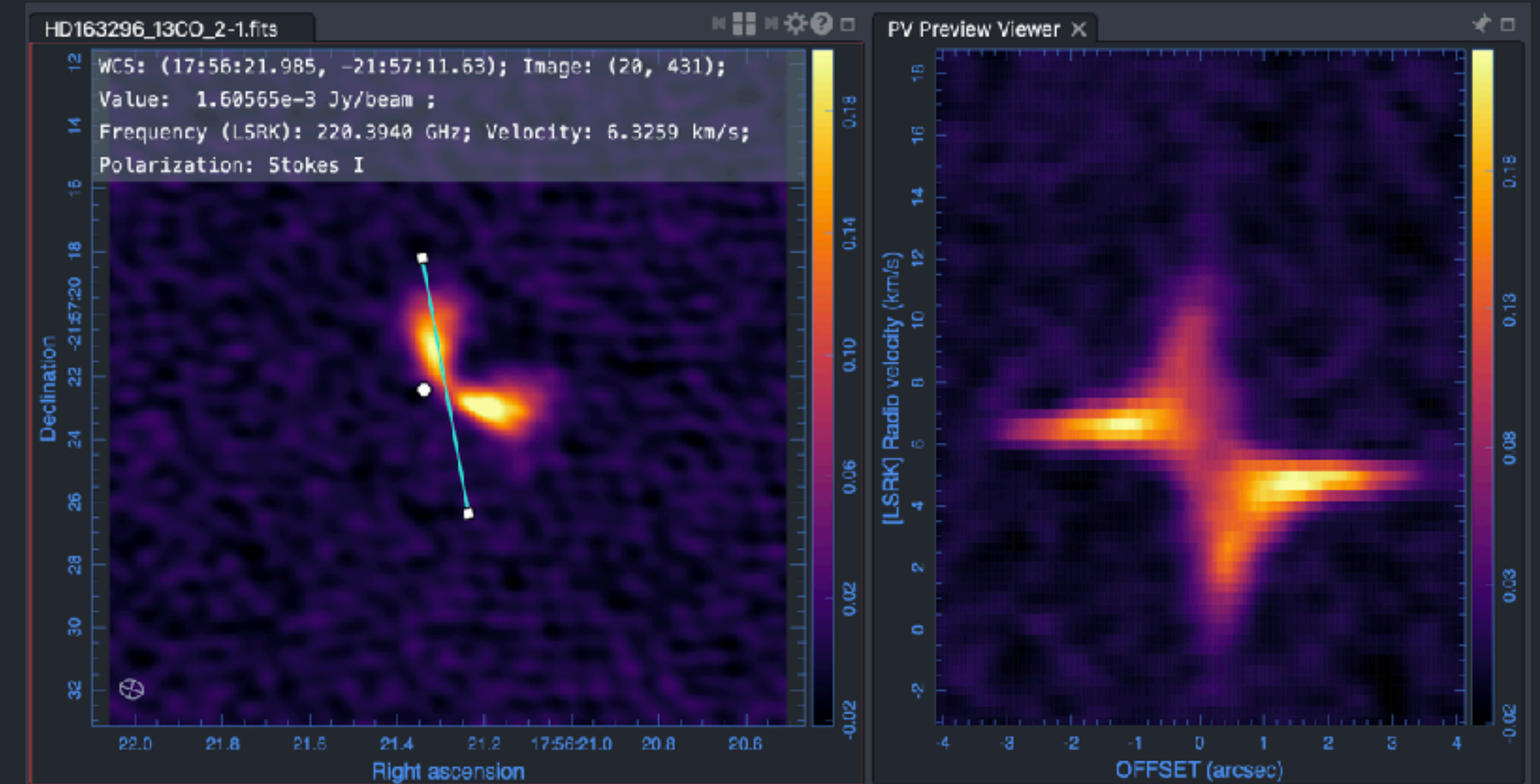
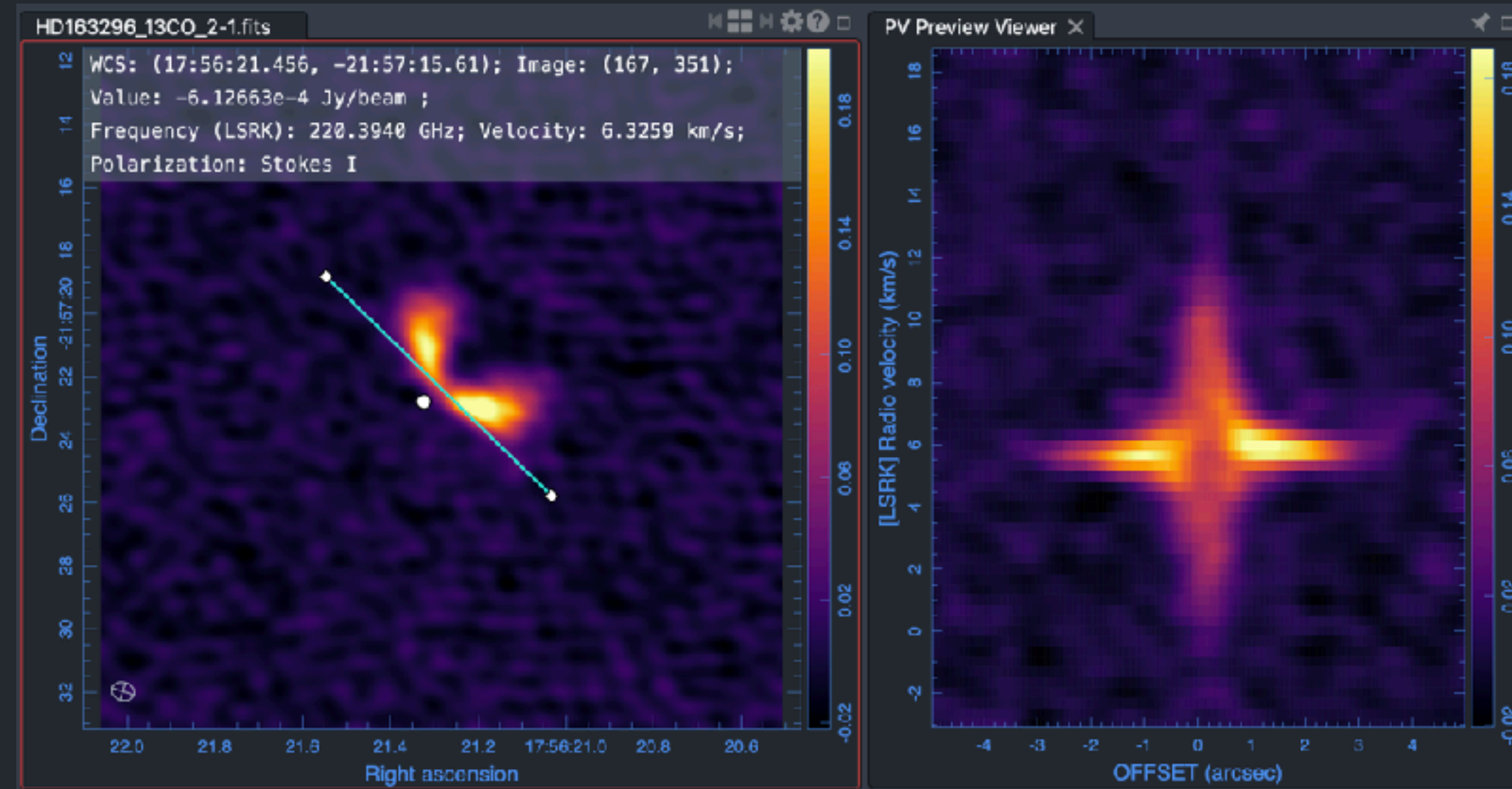
Preview region Image

Preview rebin (px) XY 1 Z 1

Preview cube size (MB) 47.78

Start preview Generate

PV preview



Color blending

FileViewWidgetsHelp

Color Blending 1

Decination

66:38:00

10

20

30

40

32

34

36

38

17:58:40

Right ascension

60000

40000

20000

0

Decination

66:38:00

10

20

30

40

32

34

36

38

17:58:40

Right ascension

50000

40000

30000

20000

10000

0

Decination

66:38:00

10

20

30

40

32

34

36

38

17:58:40

Right ascension

60000

40000

20000

0

Decination

66:38:00

10

20

30

40

32

34

36

38

17:58:40

Right ascension

60000

40000

20000

0

Render Configuration

Color blending configuration

Add layer

Apply color set

Layer 1

ngc6543_optic...

1

Layer 2

ngc6543_op

1

x

Layer 3

ngc6543_op

1

x

Image List

	Image	Layers	Matching	Chan...	Polarizat...
0	ngc6543_optical_	R	XYR	0	
1	ngc6543_optical_	R	XYR	0	
2	ngc6543_optical_	R	XYR	0	
3	Color Blending 1	R			

File Browser

Users > kchou > bz > test_images > color_blending > NGC6543

Filename	Type	Size	Date
ngc6543_optical_B.fits	FITS	25.9 MB	13 May 2024
ngc6543_optical_G.fits	FITS	25.9 MB	13 May 2024
ngc6543_optical_R.fits	FITS	25.9 MB	13 May 2024
ngc6543_xray.fits	FITS	25.9 MB	13 May 2024

File Information

Header

Name = ngc6543_optical_R.fits

HDU = 0

Data type = Short (rescaled to float)

Shape = [3600, 3600] (RA, DEC)

Coordinate type = Right Ascension, Declination

Projection = TAN

Image reference pixels = [2043.50292969, 1902.92858887]

Image reference coords = [17:58:33.6328, +66:37.55.4059]

Image ref coords (deg) = [269.64 deg, 66.6321 deg]

Celestial frame = FK5, J2000

RA range = [17:58:24.909, 17:58:41.440]

DEC range = [+66:37:10.624, +66:38:48.966]

Filter

Filter by filename with fuzzy search

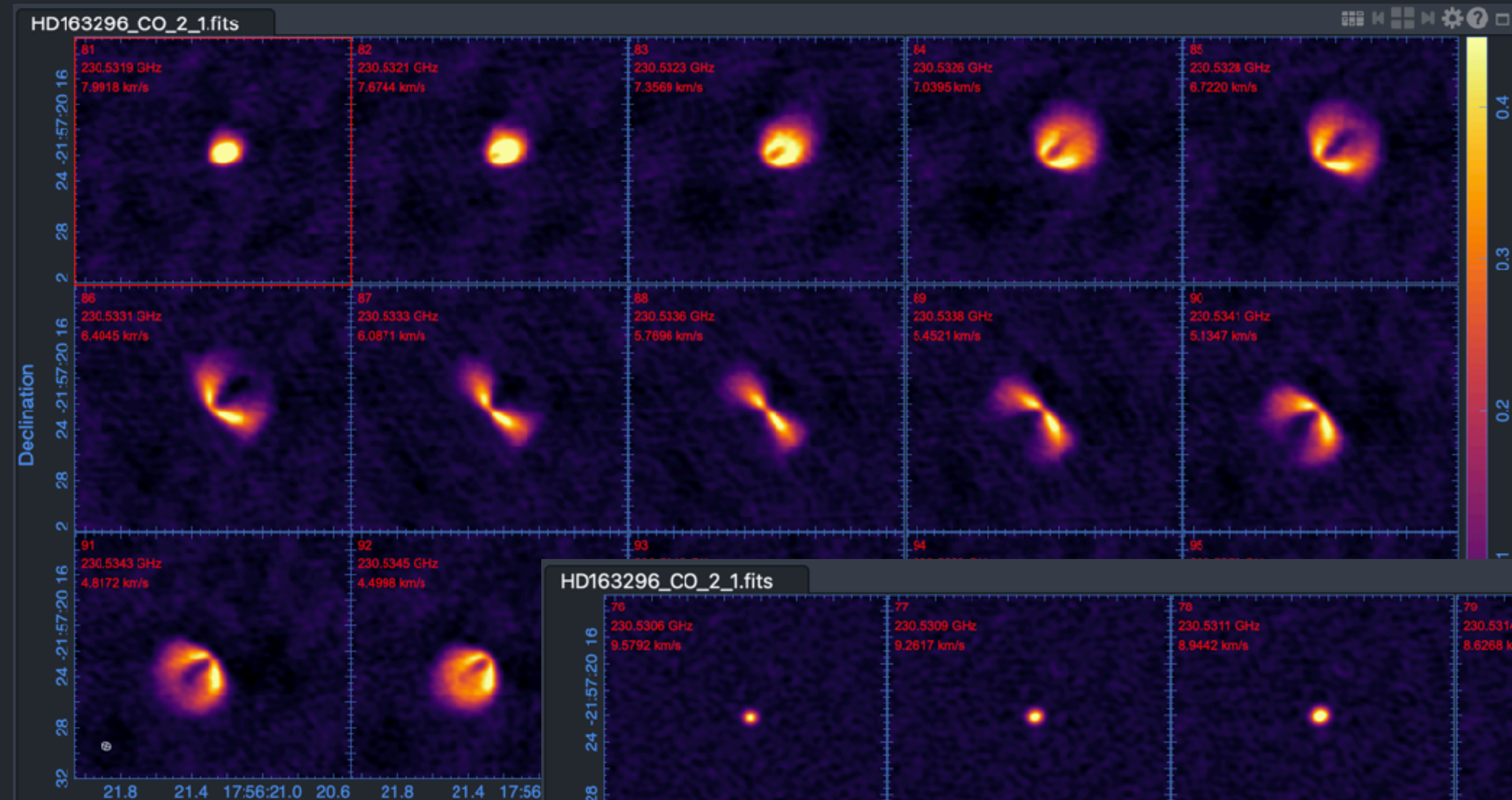
Fuzzy search

Load selected

Load as hypercube

Load with RGB blending

Channel map



Channel Map Control

K Page Channel

Start Channel 0 50 81 100 150 200 250

Image 0: HD163296_C

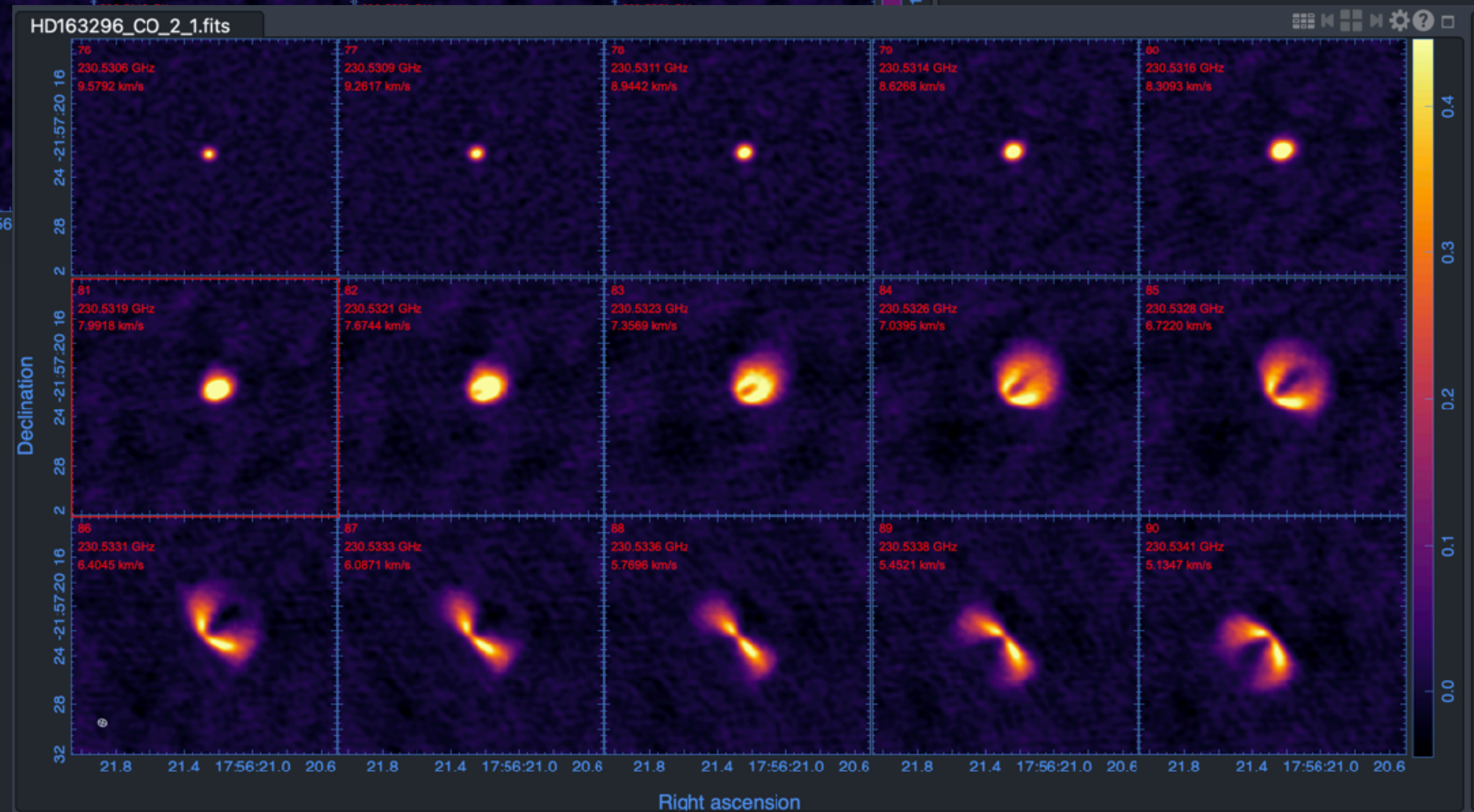
Start channel 81

Number of columns 5

Number of rows 3

Show channel string ☒ Show label

Show spectral string ☒ Show label



Channel Map Control

K Page Channel Channel Page

Start Channel 0 50 76 100 150 200 250

Image 0: HD163296_C

Start channel 76

Number of columns 5

Number of rows 3

Show channel string ☒ Show label


Show spectral string ☒ Show label

Show velocity string ☒ Show label

one



Dynamic layout

 Preferences

?

×

Global

Initial layout

Default

⇅

Render Configuration

Dynamic layout

☒

Contour Configuration

Higher dimension priority

☒

Vector Overlay Configuration

WCS and Image Overlay

Layout

Catalog




Region


Annotation

Performance

Telemetry

Compatibility

Data type	Layout	
(XY, XY)	My_2D	⇅ 
(XY, XY, Z)	Cube View	⇅ 
(XY, XY, Z, P)	4D_Polarization	⇅ 

 Restore defaults



CARTA

Cube Analysis and Rendering Tool for Astronomy, is a next generation image visualization and analysis tool designed for ALMA, VLA, and SKA pathfinders.

[Installation](#)

[User Manual](#)

[Helpdesk](#)

New release: v4.1
January 2024

<https://cartavis.org/>