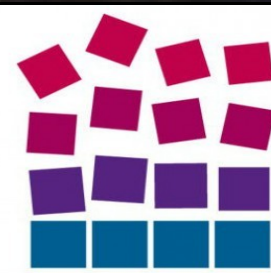


Estudio de los flujo bipolares asociados a VLA 1623 y HH 31 mediante imágenes facilitadas por el IRSA (Infrared Science Archive)

Expositora: Lic. Elizabeth Artur de la Villarmois

Observatorio Astronómico de Córdoba



UNC
400 AÑOS

IRSA (Infrared Science Archive)



www.irsa.ipac.caltech.edu

← irsa.ipac.caltech.edu

NASA/IPAC Infrared Science Archive

for NASA's Infrared and Submillimeter Data

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Search IRSA with the Data Discovery Service

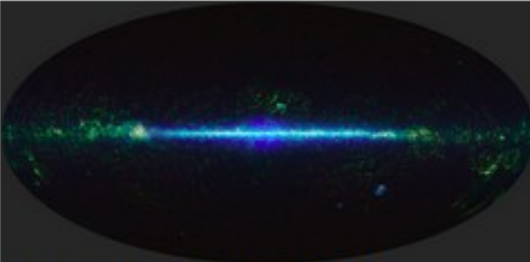
Enter an object name or coordinate:

Examples: "M31" "19h17m32s 11d58m02s Equ J2000" "46.5377 -0.2518 gal"

Enter a search radius:

News and Updates

May 22, 2013



The sky as seen by the WISE All-Sky Survey.

The Wide-field Infrared Survey Explorer (WISE) and IRSA announce the NEOWISE Post-Cryo Data Release.

The 2013 NEOWISE Post-Cryo Data Release contains 3.4 and 4.6 micron (W1 and W2) Single-exposure image and extracted source data that were acquired by WISE following the exhaustion of solid hydrogen in the satellite's payload inner and outer cryogen tanks. During this period, known as the NEOWISE Post-Cryo survey phase, the WISE optics and focal plane assemblies warmed to 73.5 K, and the W1 and W2 HgCdTe detectors continued to operate with sensitivities close to those achieved during the full cryogenic mission phase. WISE scanned approximately 70% of the sky during the Post-Cryo phase, completing a survey of the inner Main Asteroid Belt, and a second coverage epoch of the inertial sky. The 2013 NEOWISE Post-Cryo Release supersedes the 2012 Post-Cryo Preliminary Release.

Help

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Tools

- Dust Extinction
- Mosaic Services
- Data Tools
- Data Tags

Data Sets


- WISE
- Planck
- Spitzer**
- 2MASS
- IRAS

New

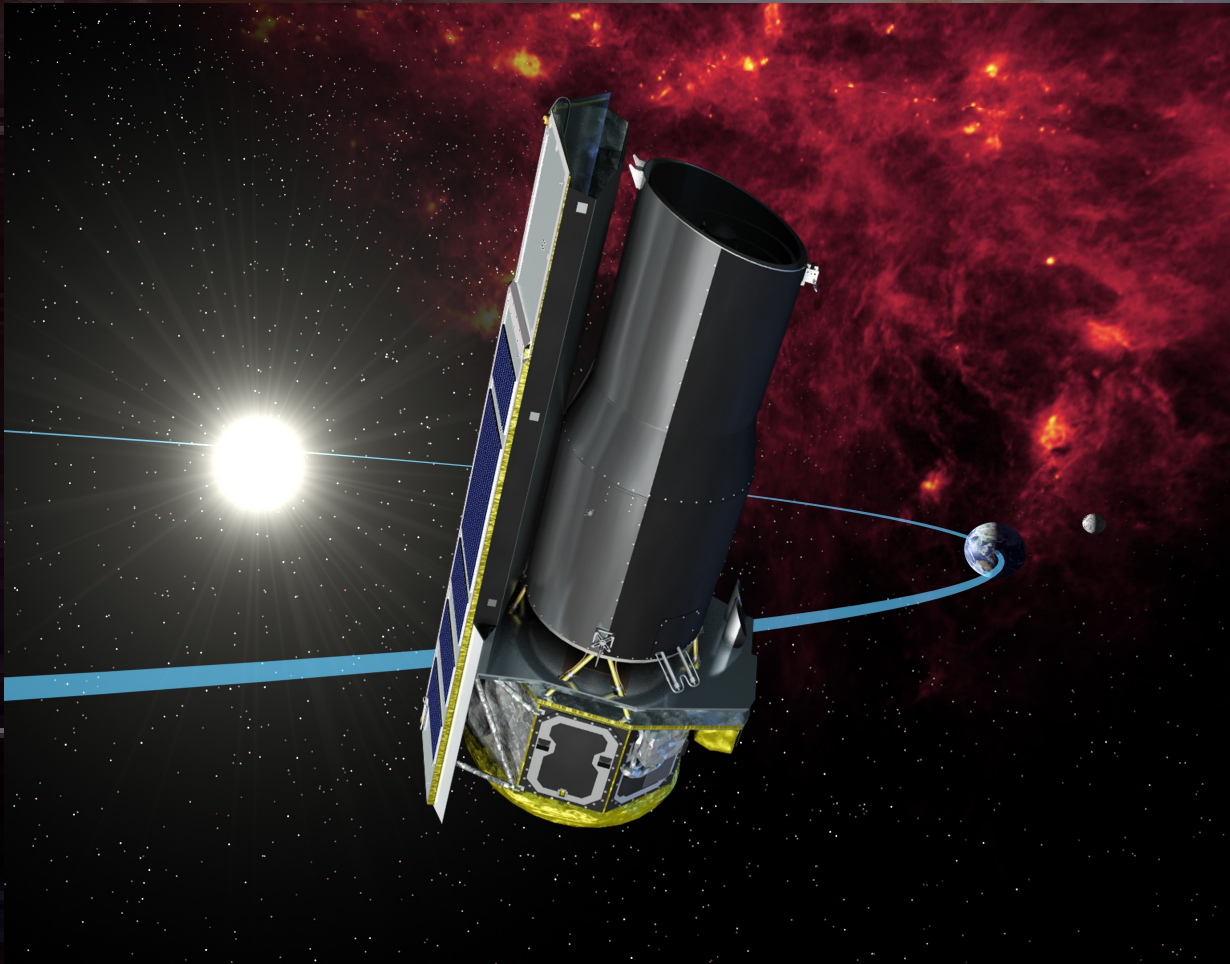
- Finder Chart v2 beta

WISE Image Service

PLANCK NASA Planck Archive



Telescopio Espacial Spitzer



Diámetro: 85 cm

Órbita: Heliocéntrica

Duración: agosto 2003 -
mayo 2009

Instrumentos: IRAC, IRS y
MIPS

IRAC (Infrared Array Camera): [3.6] μm , [4.5] μm , [5.8] μm y [8.0] μm

IRSA (Infrared Science Archive)

← irsa.ipac.caltech.edu

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Enter a search radius: arcsec |

News and Updates

May 22, 2013

Spitzer Space Telescope

- Overview
- Documentation
- Spitzer Heritage Archive
- General Catalog Queries
- Enhanced Imaging Products
- Legacy/ES Programs: Galactic Data Sets
- Legacy/ES Programs: Extragalactic Data Sets
- First Look Survey (FLS)
- Frontier Fields
- Contributed Data Sets
- Image Cutouts

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New

Finder Chart v2 beta

WISE Image Service

PLANCK NASA Planck Archive

IRSA (Infrared Science Archive)

Spitzer Space Telescope

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Search IRSA with the Data Discovery Service

Enter an object name or coordinate:

Examples: "M31" "12h17m32s 11d08m02s Eqa J2000" "40.507171-0.251818-gal"

Enter a search radius: arcsec

News and Updates

April 18, 2013

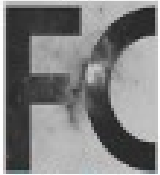





IRSA announces the release of new data from the **S4G** Spitzer Exploration Science program and from the **COSMOS** survey.

The **S4G catalog** is now available, including photometry, model fit parameters, measurements from the literature, and links to the S4G data for each galaxy. Ellipse fit models are also now available for all 2,352 galaxies.

The **COSMOS** archive now includes the galaxy density measurements from *Scoville et al. (2013)*.

March 21, 2013

ESA, NASA, the Planck Collaboration, and IRSA announce the first release of all sky temperature maps, foreground component maps and cosmology results from the **Planck** mission. Also included in this release are updated catalogs of sources that are foregrounds to the CMB, mission and instrument parameters, software, and external data.



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Spitzer

irsa.ipac.caltech.edu/data/SPITZER/Enhanced/Imaging/overview.html

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Spitzer Enhanced Imaging Products: Overview




The Spitzer Science Center and IRSA have released a set of Enhanced Imaging Products (SEIP) from the Spitzer Heritage Archive. These include Super Mosaics (combining data from multiple programs where appropriate) and a Source List of photometry for compact sources. The primary requirement on the Source List is very high reliability – with areal coverage, completeness, and limiting depth being secondary considerations. The SEIP include data from the four channels of IRAC (3.4, 4.5, 5.6, 8 microns) and the 24 micron channel of MIPS. The full set of products for the Spitzer cryogenic mission includes around 20 million sources.

Super Mosaics and Cutouts

| Service | Product | Image Size | Access Type |
|--|---------------|-------------------------|--|
| Image Search | Super Mosaics | max 2 sq deg | Web Interface |
| Spitzer Heritage Archive | Super Mosaics | max 2 sq deg | Web Interface; Click on "SNC: Enhanced Mosaic Images (Super Mosaics)". Then on results page, click on "Super Mosaics" tab. |
| Cutout Service | Cutouts | 0.005-0.5 deg on a side | Web Interface |

Documentation and Help
[Spitzer Enhanced Imaging Products Explanatory Supplement](#)
IRSA Helpdesk



irsa.ipac.caltech.edu/data/SPITZER/Enhanced/Imaging/index

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Spitzer Heritage Archive Enhanced Imaging Products Cutouts

[Cutouts Instructions](#) [Program Interface](#) [Imaging Archive](#)

Single Location

Coordinate/Object:

Cutout Size: (deg) [range: 0.005-0.5 deg]

Coordinate Examples:

- 335.08 59.19 eq
- 22h20m20.0s 59d11m26s Equ J2000
- 104.638 1.795 ga

Default: Equatorial J2000

NOTE: For single cutouts of Imaging data larger than 0.5 deg, you can use [Atlas](#), where the search size acts as your cutout size, up to 0.6 degrees.

Multiple Positions (User Table Upload)

Table Upload Instructions: The input table should contain a list of coordinates or astronomical object names; a (cutout) size column is optional. Please see [allowed table format](#) information. A cutout size may be specified in a column in the input table, allowing for a different cutout size per position. Or, to have the same size cutouts for all input positions, specify one value in the **Uniform Cutout size** field below. [Example table](#).

Table

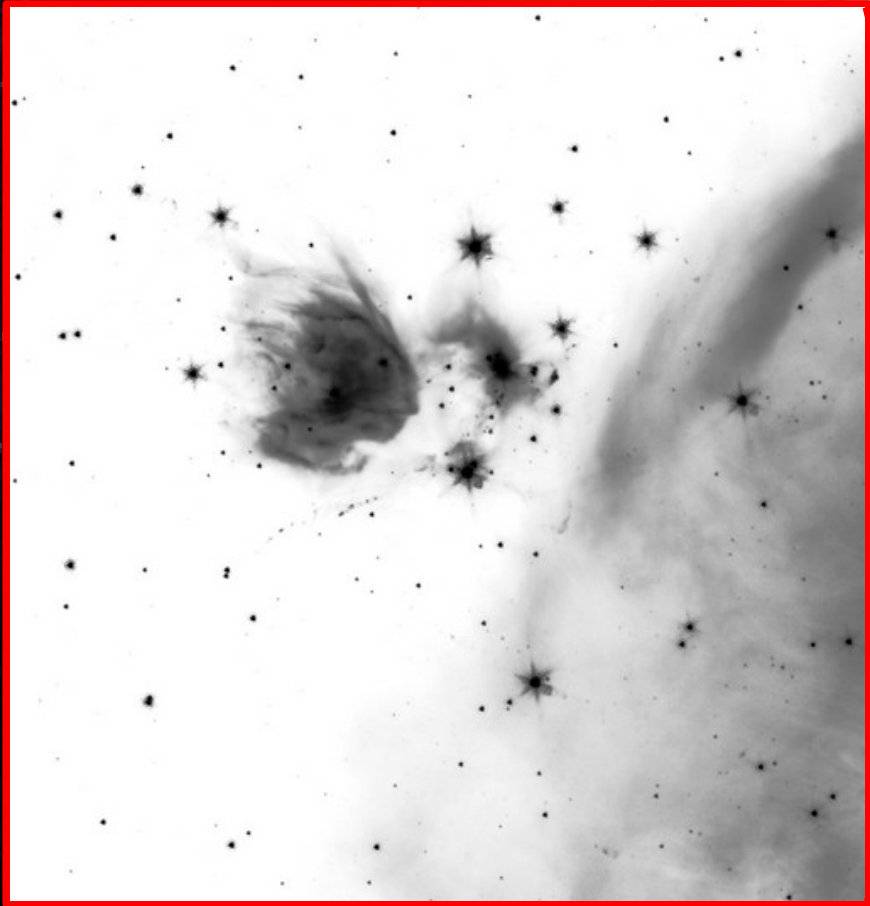
Uniform Cutout size (deg)
[range: 0.005-0.5 deg]:

Or, specify a non-uniform cutout size here for each position in the table using a cutout size column name:

Cutout size column name:

[Select All Data Sets](#) | [De-select All Data Sets](#)

Spitzer



irsa.ipac.caltech.edu/cgi-bin/bgServices/nph-bgExec

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Imaging: Cutout Location: name VLA 1623

| | | |
|---------------------|--|---------------|
| Cutout Stats | Total number of cutouts created: | 72 |
| | Total number of cutouts skipped (due to blank image sections): | 0 |
| | Cutout size [N/A if size included in upload table]: | 0.250 degrees |

The **Quickview Table** below displays up to 50 of the cutout results. Click on the **Quicklook** image to see a full-size JPEG preview of the cutout; click on **To Disk** to download the FITS version of the cutout, or **To OASIS** to view the FITS cutout in the IRSA fits viewer applet.

Download Instructions

Use unix tools like GNU 'wget' to download all the cutouts (FITS and JPEGs) to disk. [WGET HELP] Use the following command to download the fits cutouts; substitute "-A fits" with "-A jpg" to download the JPEG previews:

```
wget -r -nd -A fits -l 2 http://irsa.ipac.caltech.edu/workspace/TMP_8eSzPf_6954/Cutouts/name_VLA_1623.v0003/results
```

To download all the cutouts, a tar file can be created with all the results (FITS and JPEGs). **Warning:** this results page (and the option to download using the above options) will no longer be accessible once the tar file is made. Click on the **DOWNLOAD TAR FILE** button to get all the results bundled in a tar file.

[DOWNLOAD TAR FILE](#)

| Quicklook | RA | Dec | Dataset | Original Filename | Download |
|-----------|--------------|--------------|---------|--|---|
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87-short.IRAC.4.mosaic.fits | To disk To OASIS |
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87.IRAC.3.mosaic.fits | To disk To OASIS |
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87-short.IRAC.3.median_mosaic.fits | To disk To OASIS |
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87.IRAC.2.median_mosaic.fits | To disk To OASIS |
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87-short.IRAC.4.median_mosaic.fits | To disk To OASIS |
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87.IRAC.1.mosaic.fits | To disk To OASIS |
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87-short.IRAC.1.median_mosaic.fits | To disk To OASIS |
| | 246.61008000 | -24.40833000 | science | 40015561.40015561-87-short.IRAC.2.mosaic.fits | To disk To OASIS |

Flujos bipolares

- Proto-estrellas de clase 0 y I → Edad < 200000 años.
→ $T_{\text{bol}} < 650 \text{ K}$.
→ Procesos de acreción y eyección.

Óptico

HH 30

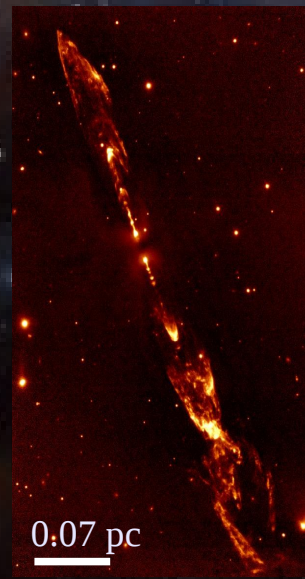


Hubble Space Telescope

- ▶ $\text{H}\alpha \rightarrow 6563 \text{ \AA}$.
- ▶ $[\text{S II}] \rightarrow 6716 - 6731 \text{ \AA}$.
- ▶ Colimación alta.
- ▶ $V_{\text{gas}} = 100 - 500 \text{ Km.s}^{-1}$

Infrarrojo

HH 212

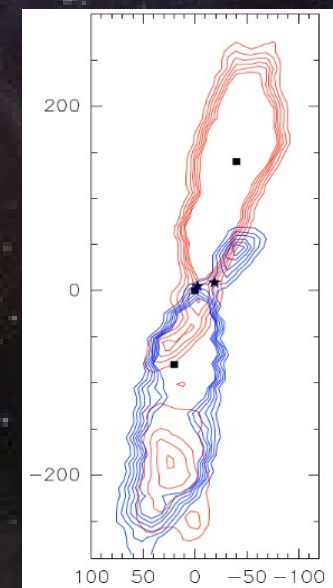


McCaughrean et al. (1994)

- ▶ $\text{H}_2 \rightarrow 2.12 \text{ \mu m}$.
- ▶ Spitzer → $[3.6] \text{ \mu m}$ y $[4.5] \text{ \mu m}$.
- ▶ Colimación intermedia.
- ▶ $V_{\text{gas}} = 50 - 100 \text{ Km.s}^{-1}$

Radio

BHR 71

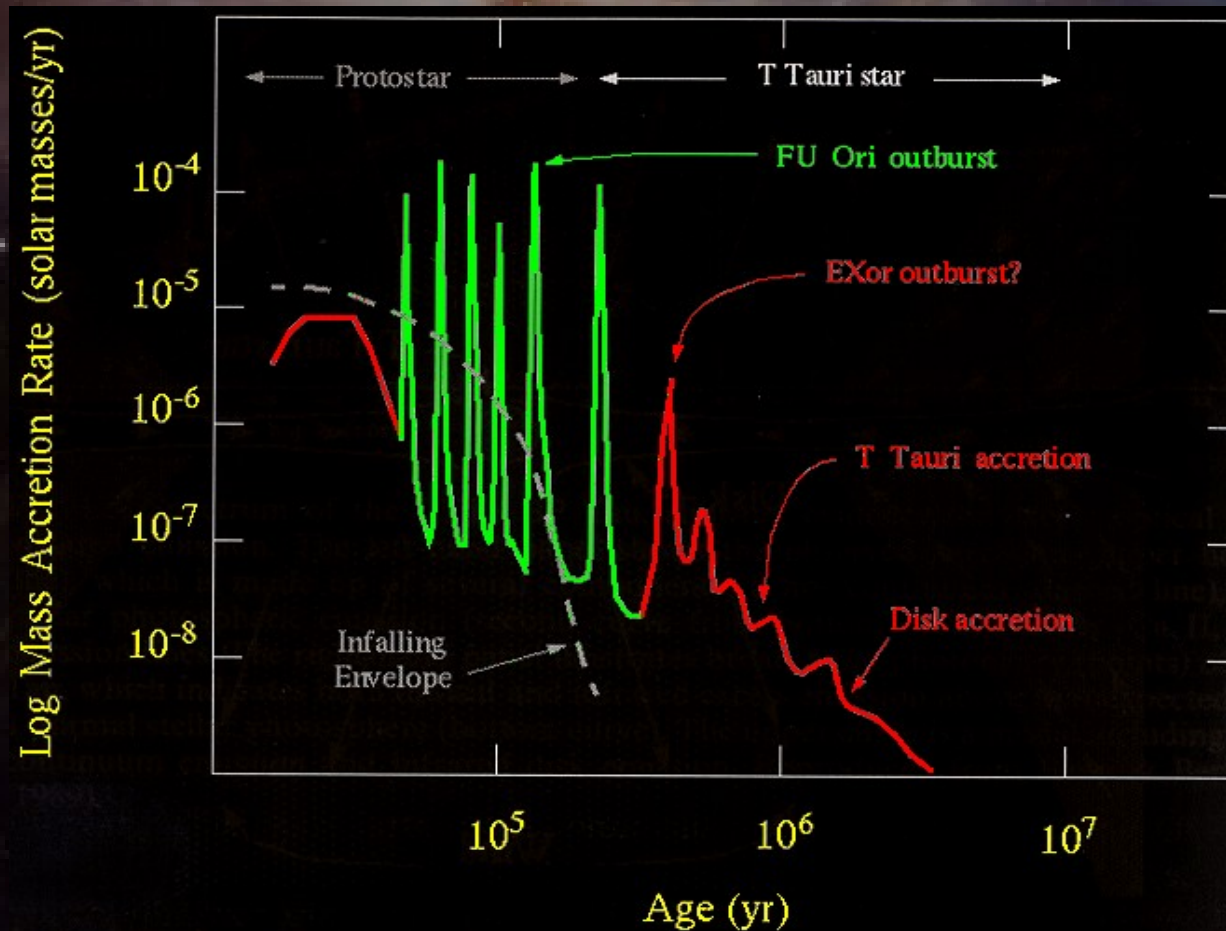


Parise et al. (2006)

- ▶ $\text{CO} \rightarrow 2.7 \text{ mm}$.
- ▶ Colimación pobre.
- ▶ $V_{\text{gas}} < 50 \text{ Km.s}^{-1}$

Eventos de tipo FU Orionis

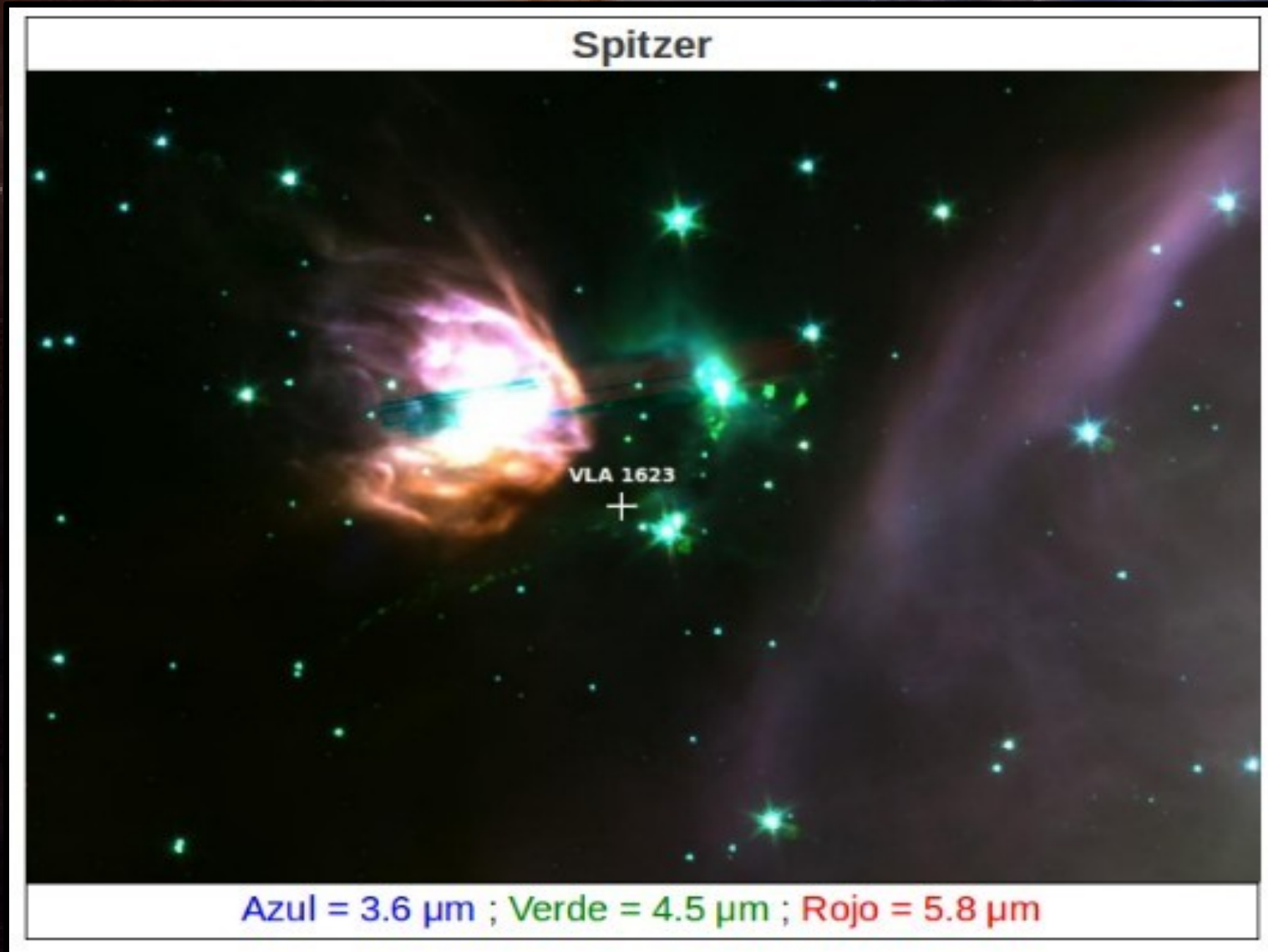
- Objetos jóvenes (estrellas T Tauri) que presentan variaciones de brillo de tipo eruptivos.
- ~ 25 objetos.



Hartmann (1998)

Resultados

VLA 1623



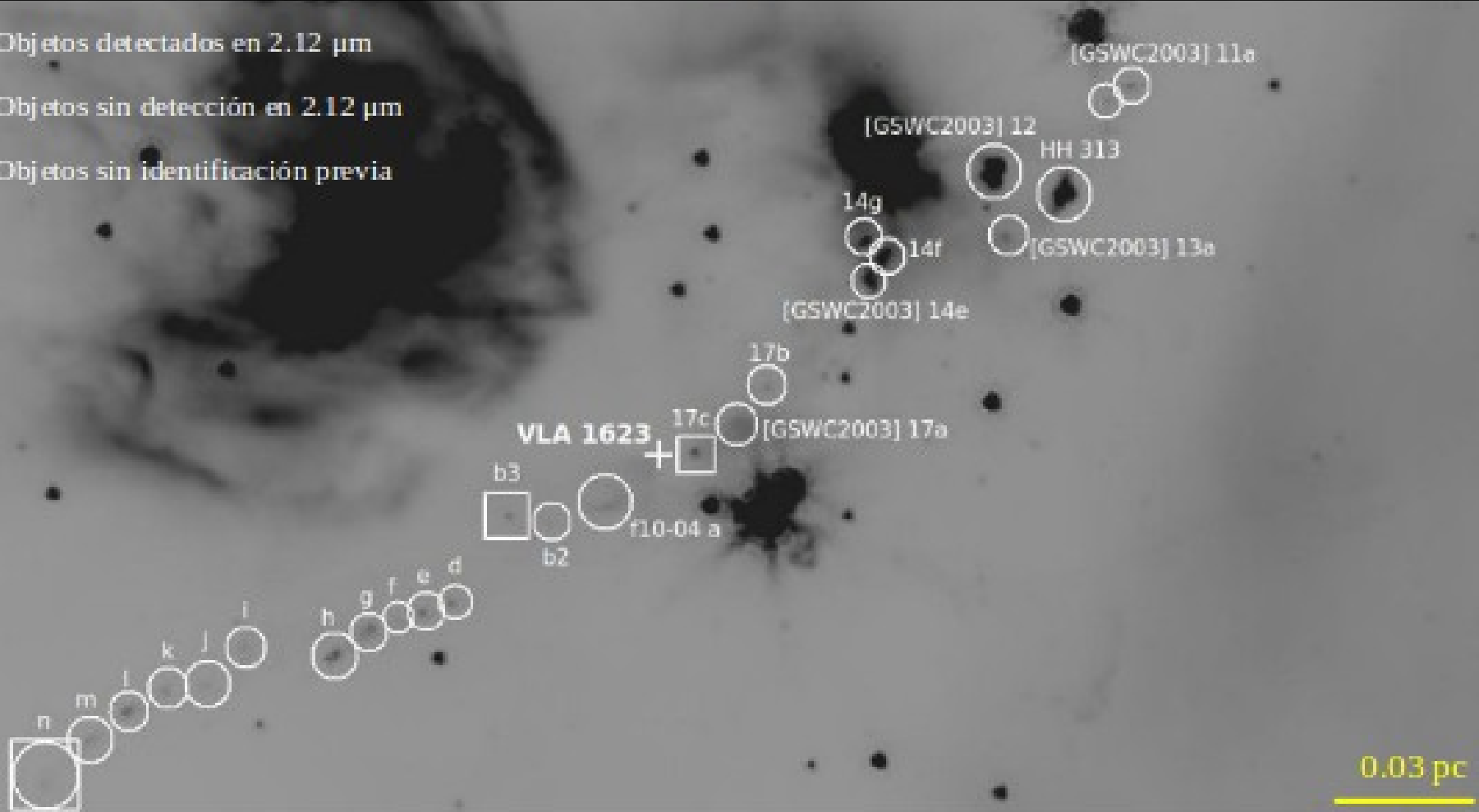
$t_c = 225$ años

Resultados

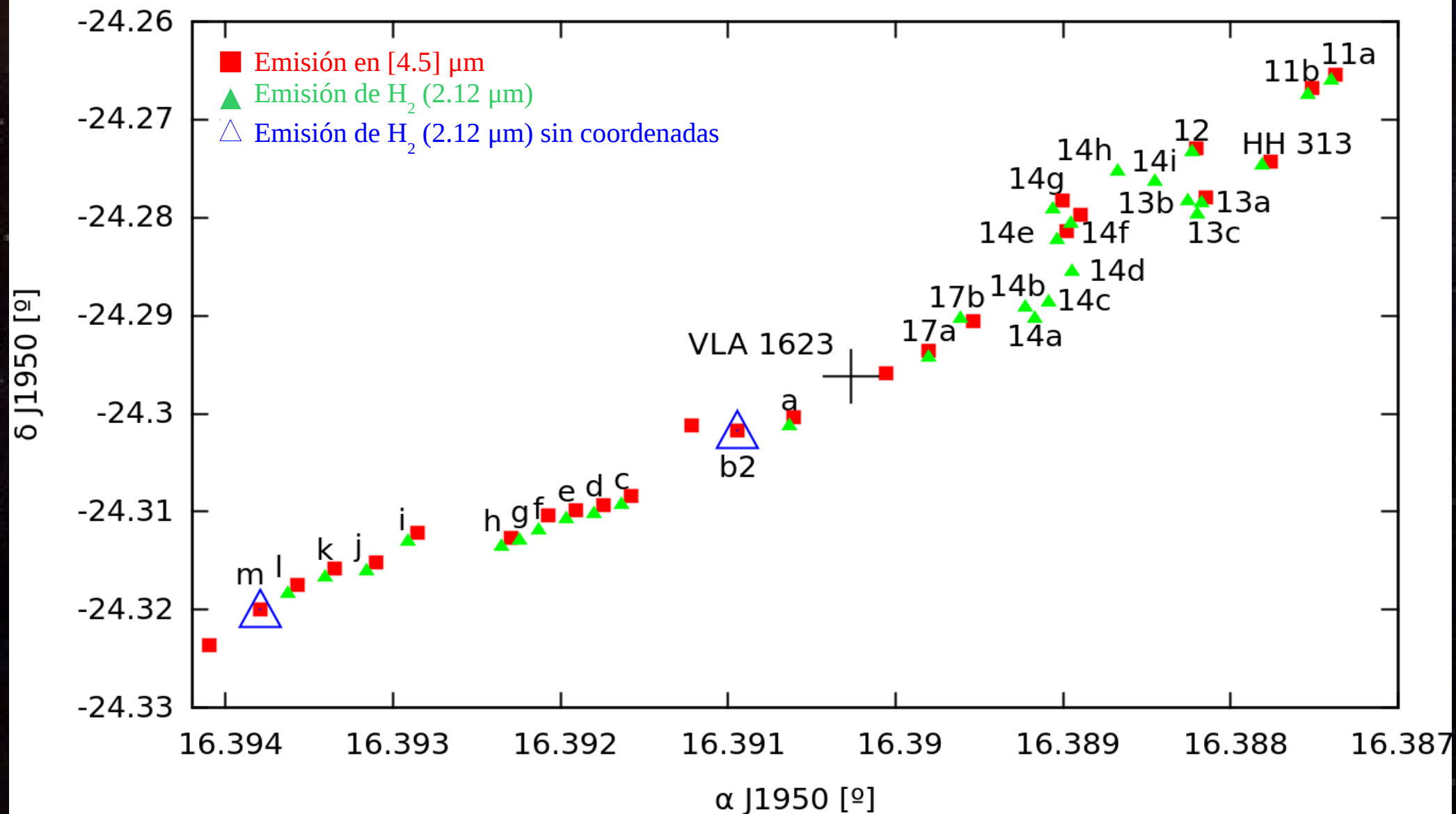
VLA 1623

IRAC 2

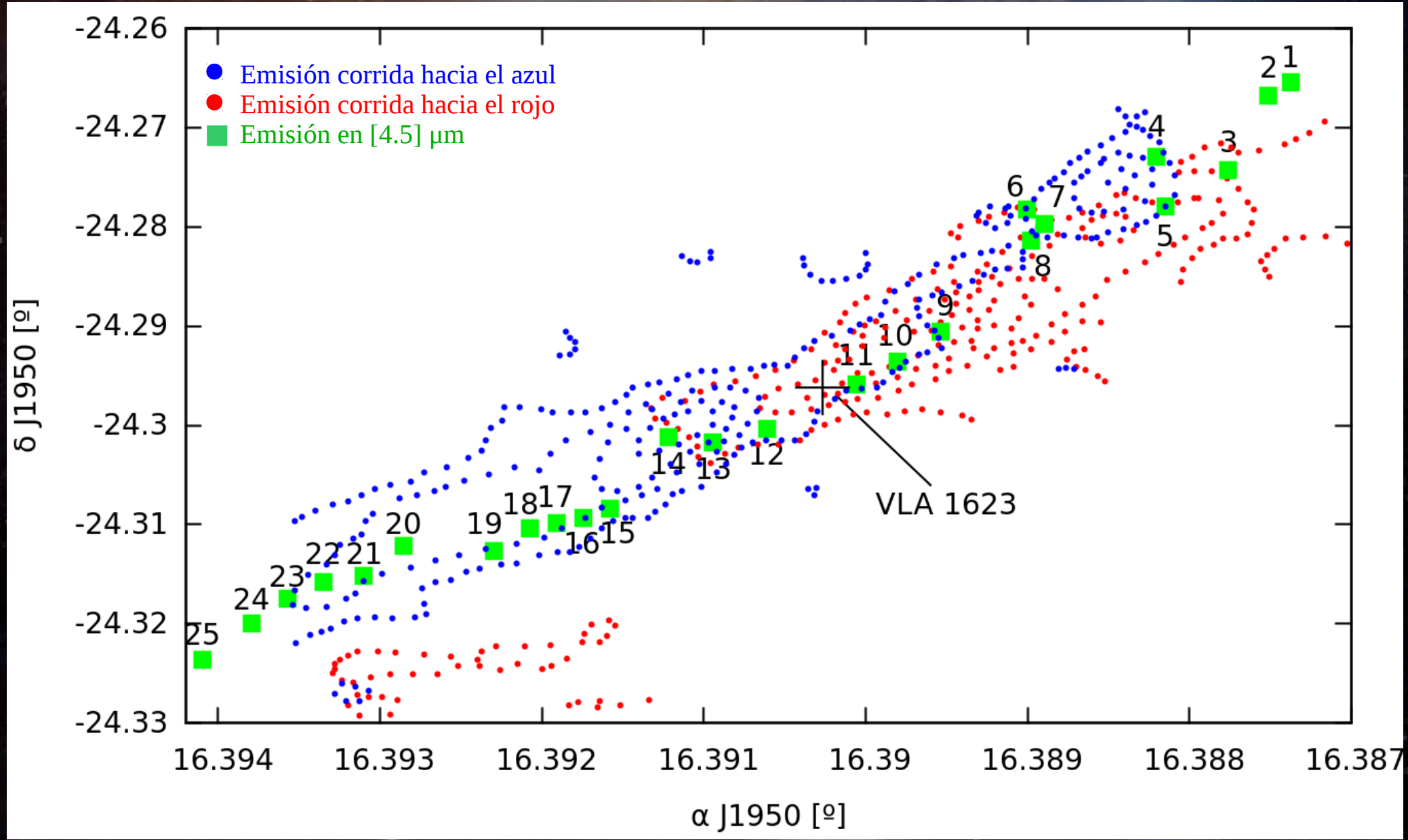
- Objetos detectados en 2.12 μm
- ◻ Objetos sin detección en 2.12 μm
- ◻ Objetos sin identificación previa



Emisión en $[4.5] \mu\text{m}$ y H_2 ($2.12 \mu\text{m}$)



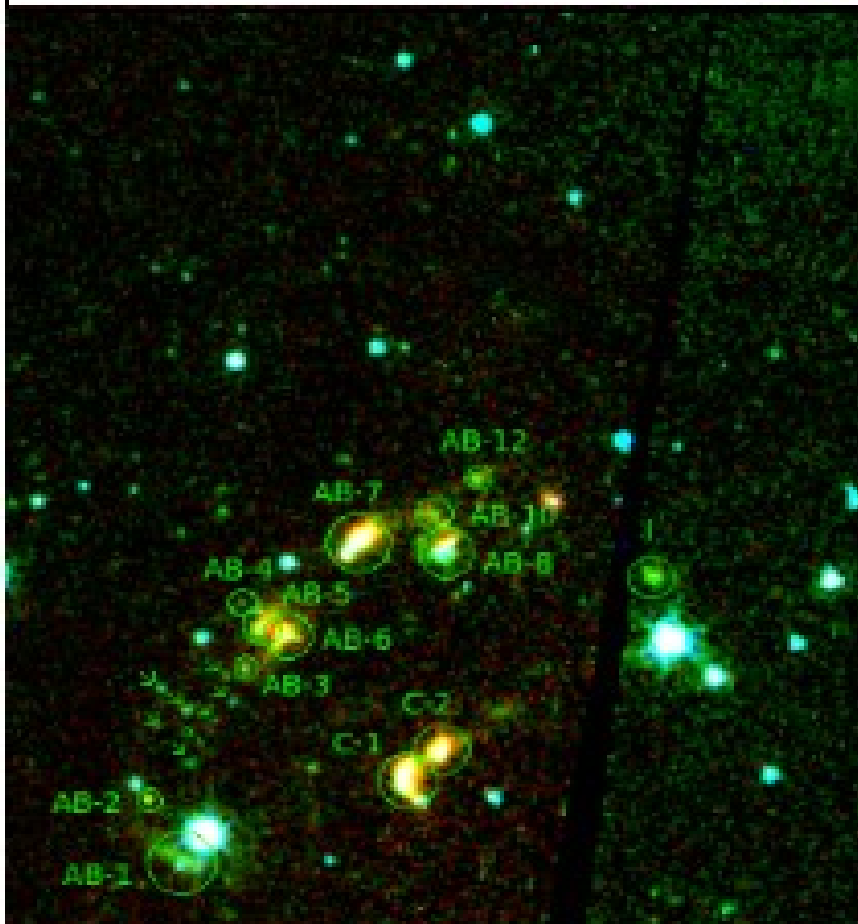
Emisión en CO y [4.5] μm



Resultados

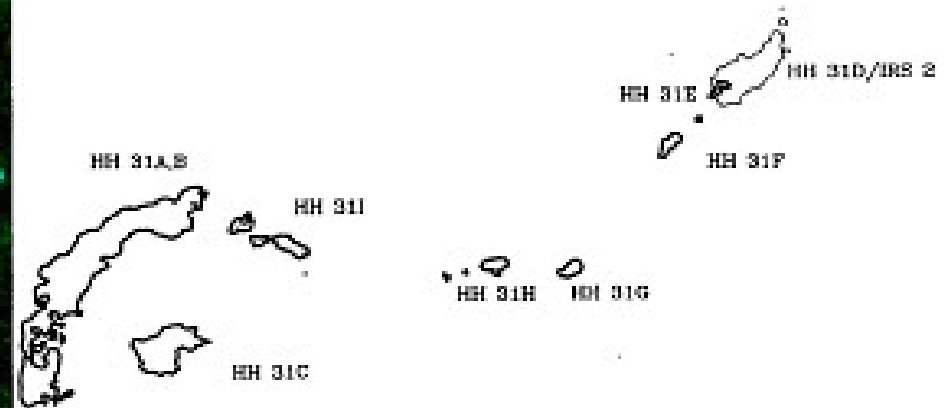
HH 31

Spitzer



Gómez et al. (1997)

04248+2612
HH 31

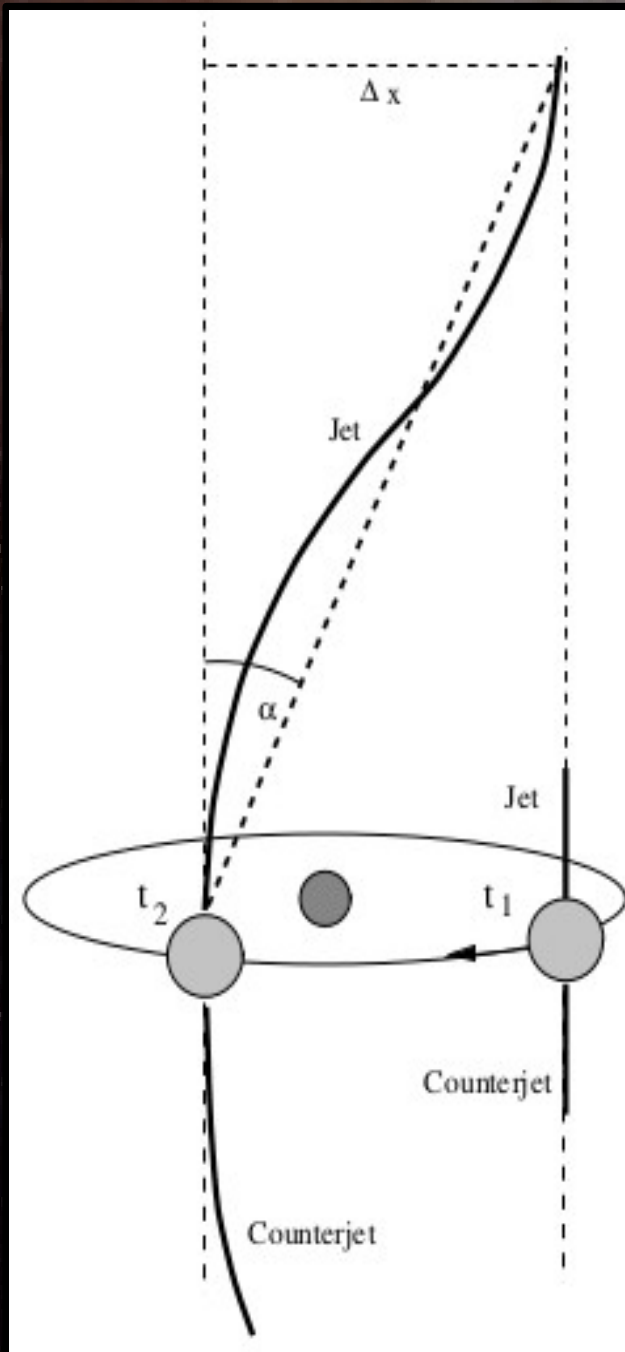


1 arc min

Azul = 3.6 μm ; Verde = 4.5 μm ; Rojo = 8.0 μm

HH 31

Frendt & Zinnecker (1998)



$$P = \sqrt{\frac{a^3}{M_1 + M_2}}$$

$a \sim 25 \text{ UA.}$
 $M = 0.07 M_{\odot}$

$\rightarrow P = 472.5 \text{ años.}$

$$t_c = l/v$$

$l = 0.264 \text{ pc.}$
 $v = 200 \text{ Km.s}^{-1}$

$\rightarrow 2.7 \text{ vueltas.}$

Resultados

VLA 1623

IRAS 04248+2612

| Objeto | α J2000 (medido) | δ J2000 (medido) | α J2000 (SGOs) | δ J2000 (SGOs) |
|----------------|----------------------------|----------------------------|--------------------------|--------------------------|
| [GSWC2003] 11a | 16 26 15.9 | -24 22 40 | 16 26 15.9 | -24 22 41 |
| [GSWC2003] 11b | 16 26 16.4 | -24 22 45 | 16 26 16.4 | -24 22 45 |
| HH 313 | 16 26 17.3 | -24 23 12 | 16 26 17.5 | -24 23 13 |
| [GSWC2003] 12 | 16 26 18.9 | -24 23 07 | 16 26 19.0 | -24 23 05 |
| [GSWC2003] 13a | 16 26 18.7 | -24 23 25 | | |
| [GSWC2003] 14e | 16 26 21.7 | -24 23 37 | 16 26 21.8 | -24 23 37 |
| [GSWC2003] 14f | 16 26 21.4 | -24 23 31 | 16 26 21.4 | -24 23 31 |
| [GSWC2003] 14g | 16 26 21.8 | -24 23 26 | 16 26 21.9 | -24 23 26 |
| [GSWC2003] 17a | 16 26 24.7 | -24 24 21 | | |
| [GSWC2003] 17b | 16 26 24.0 | -24 24 10 | | |
| [GSWC2003] 17c | 16 26 25.6 | -24 24 29 | | |
| f10-04a | 16 26 27.6 | -24 24 45 | | |
| f10-04b2 | 16 26 28.8 | -24 24 50 | | |
| f10-04b3 | 16 26 29.8 | -24 24 48 | | |
| f10-04d | 16 26 31.1 | -24 25 14 | 16 26 31.1 | -24 25 14 |
| f10-04e | 16 26 31.7 | -24 25 17 | 16 26 31.7 | -24 25 17 |
| f10-04f | 16 26 32.3 | -24 25 19 | 16 26 32.3 | -24 25 19 |
| f10-04g | 16 26 32.9 | -24 25 21 | 16 26 32.9 | -24 25 22 |
| f10-04h | 16 26 33.7 | -24 25 29 | 16 26 33.7 | -24 25 29 |
| f10-04i | 16 26 35.7 | -24 25 27 | 16 26 35.7 | -24 25 27 |
| f10-04j | 16 26 36.6 | -24 25 38 | 16 26 36.6 | -24 25 39 |
| f10-04k | 16 26 37.5 | -24 25 40 | 16 26 37.5 | -24 25 40 |
| f10-04l | 16 26 38.3 | -24 25 46 | 16 26 38.3 | -24 25 46 |
| f10-04m | 16 26 39.1 | -24 25 55 | 16 26 39.2 | -24 25 54 |
| f10-04n | 16 26 40.2 | -24 26 08 | 16 26 40.2 | -24 26 07 |

| Nodos | α (J2000.0) | δ (J2000.0) | P.A. (°) | d (pc) |
|-------|--------------------|--------------------|----------|--------|
| AB-1 | 04:28:23.381 | +26:16:37.40 | 115,015 | 0,262 |
| AB-2 | 04:28:23.605 | +26:16:50.60 | 112,603 | 0,261 |
| AB-3 | 04:28:21.733 | +26:17:28.41 | 108,407 | 0,235 |
| AB-4 | 04:28:21.778 | +26:17:47.01 | 105,241 | 0,231 |
| AB-5 | 04:28:21.331 | +26:17:41.02 | 106,635 | 0,229 |
| AB-6 | 04:28:20.885 | +26:17:36.82 | 107,425 | 0,226 |
| AB-7 | 04:28:19.369 | +26:18:06.23 | 103,495 | 0,208 |
| AB-8 | 04:28:17.673 | +26:18:02.04 | 105,386 | 0,193 |
| AB-9 | 04:28:18.209 | +26:18:06.83 | 104,386 | 0,197 |
| AB-10 | 04:28:17.941 | +26:18:13.43 | 103,017 | 0,194 |
| AB-11 | 04:28:17.674 | +26:18:20.64 | 101,627 | 0,190 |
| AB-12 | 04:28:17.049 | +26:18:23.64 | 101,71 | 0,185 |
| C-1 | 04:28:18.519 | +26:16:54.83 | 116,521 | 0,216 |
| C-2 | 04:28:17.806 | +26:17:05.03 | 115,67 | 0,209 |
| F-1 | 04:27:59.736 | +26:18:43.44 | 136,525 | 0,033 |
| F-2 | 04:27:59.289 | +26:18:48.24 | 139,869 | 0,027 |
| F-3 | 04:27:58.798 | +26:18:44.04 | 149,625 | 0,027 |
| G | 04:28:02.994 | +26:17:40.45 | 141,91 | 0,084 |
| I | 04:28:13.524 | +26:17:55.45 | 110,715 | 0,159 |

Conclusiones

- ◆ La base de datos del IRSA es de gran utilidad para el estudio de objetos en el infrarrojo y en el sub-milimétrico, ya que cuenta con datos e imágenes de diversas misiones y programas científicos.
- ◆ El Spitzer presenta una alta resolución y sensibilidad, por lo cual, resultó muy útil a la hora de estudiar objetos asociados a jets o flujos moleculares, ya que se encuentran embebidos en su nube madre y son relativamente débiles.
- ◆ Se calculó un t_c promedio de 225 años entre nudos consecutivos asociados a VLA 1623 y de 122 años para el caso de HH 31, lo cual se corresponde bastante bien con el período de los eventos de tipo FU Orionis.
- ◆ Se detectaron dos nuevos objetos para el caso de VLA 1623, los cuales no habían sido previamente identificados en el infrarrojo, y con respecto a HH 31 se dividieron algunos de sus nudos asociados en diversas sub-estructuras.
- ◆ En ambos casos se determinaron las coordenadas ecuatoriales de los nudos observados.
- ◆ Es posible asociar la forma sinusoidal que presenta HH 31 con la binaridad de la fuente.

**¡MUCHAS
GRACIAS!**

Elizabeth Artur de la Villarmois

Mail: eliartur@yahoo.com.ar

OAC