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

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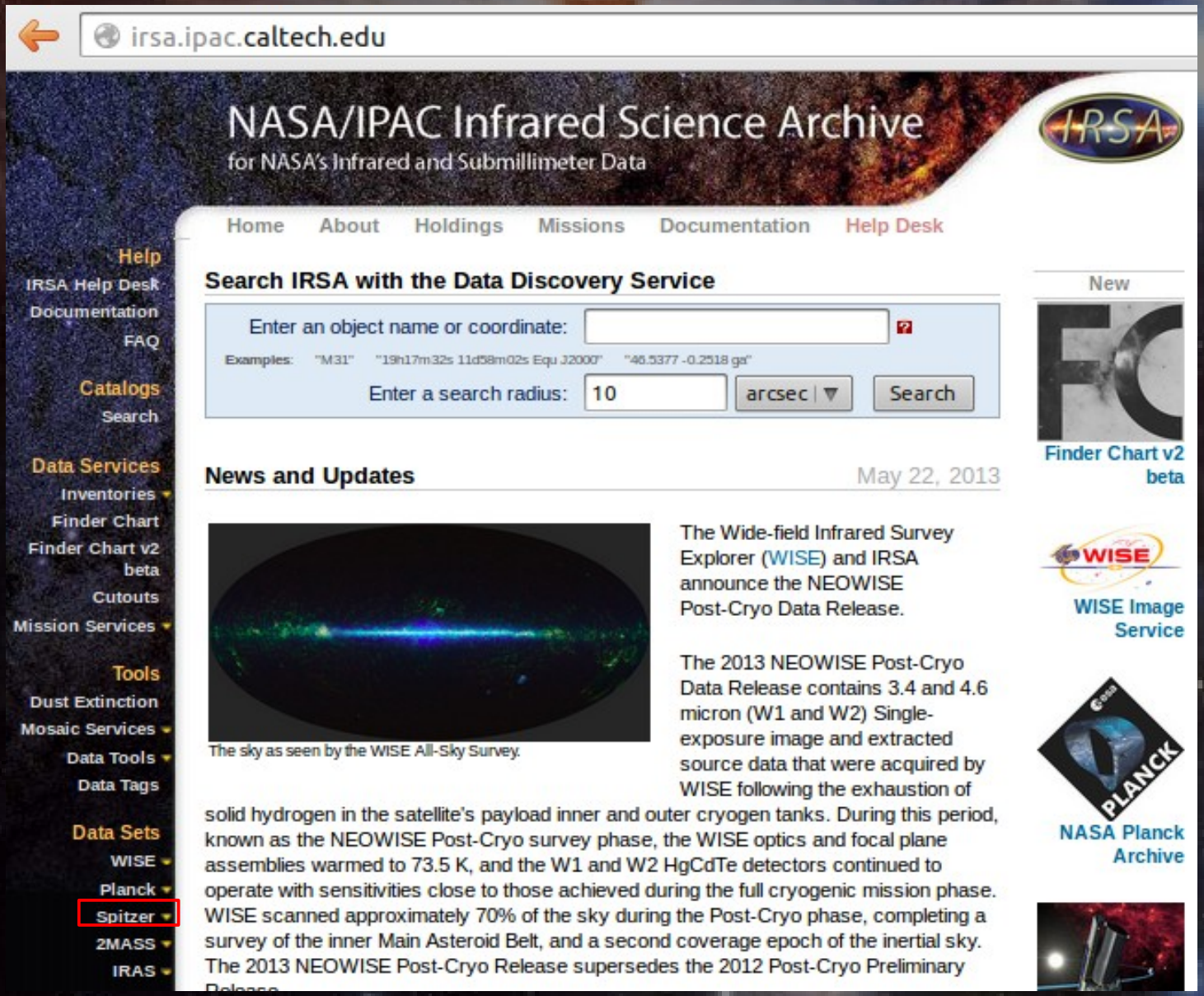
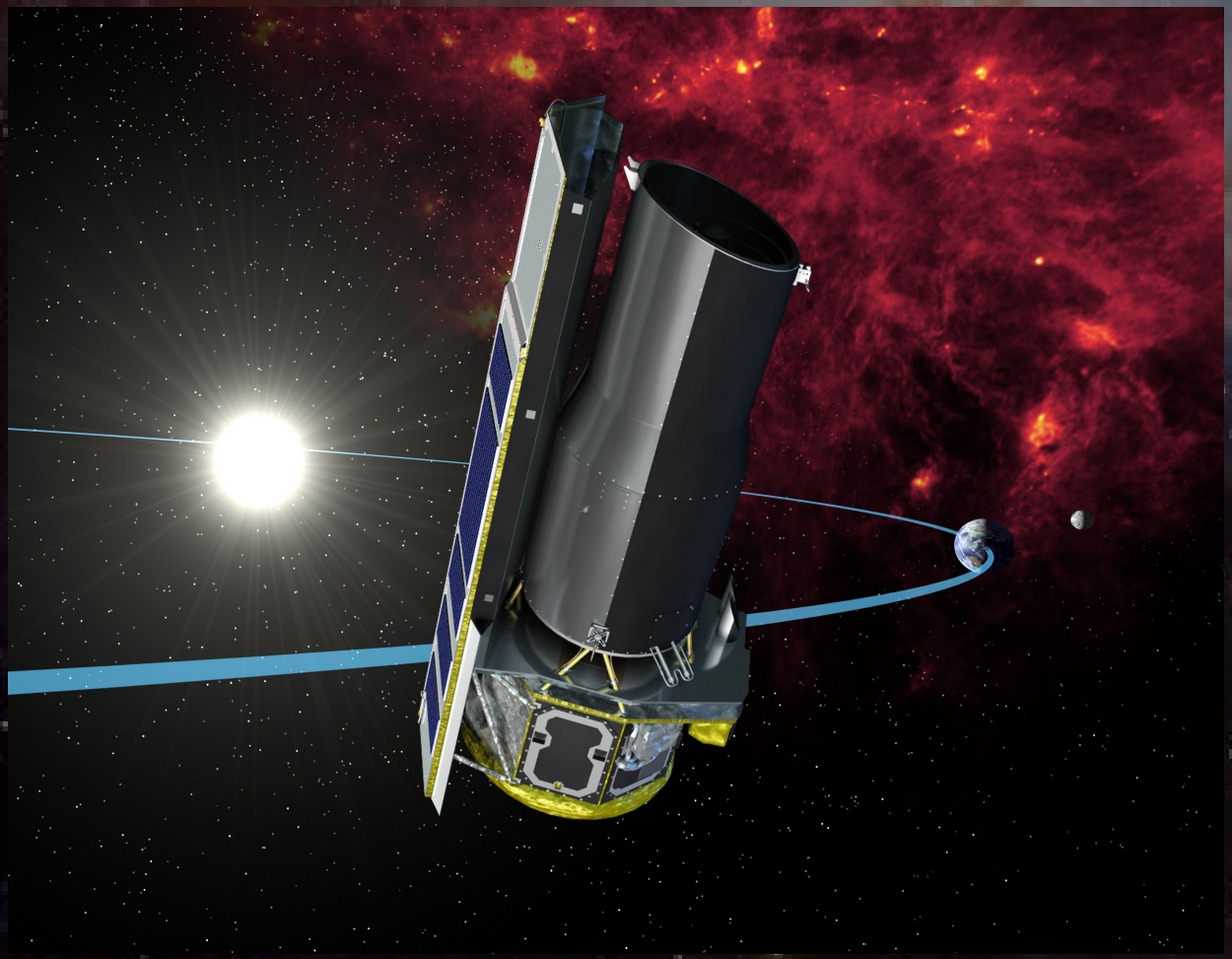


Telescopio Espacial Spitzer



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

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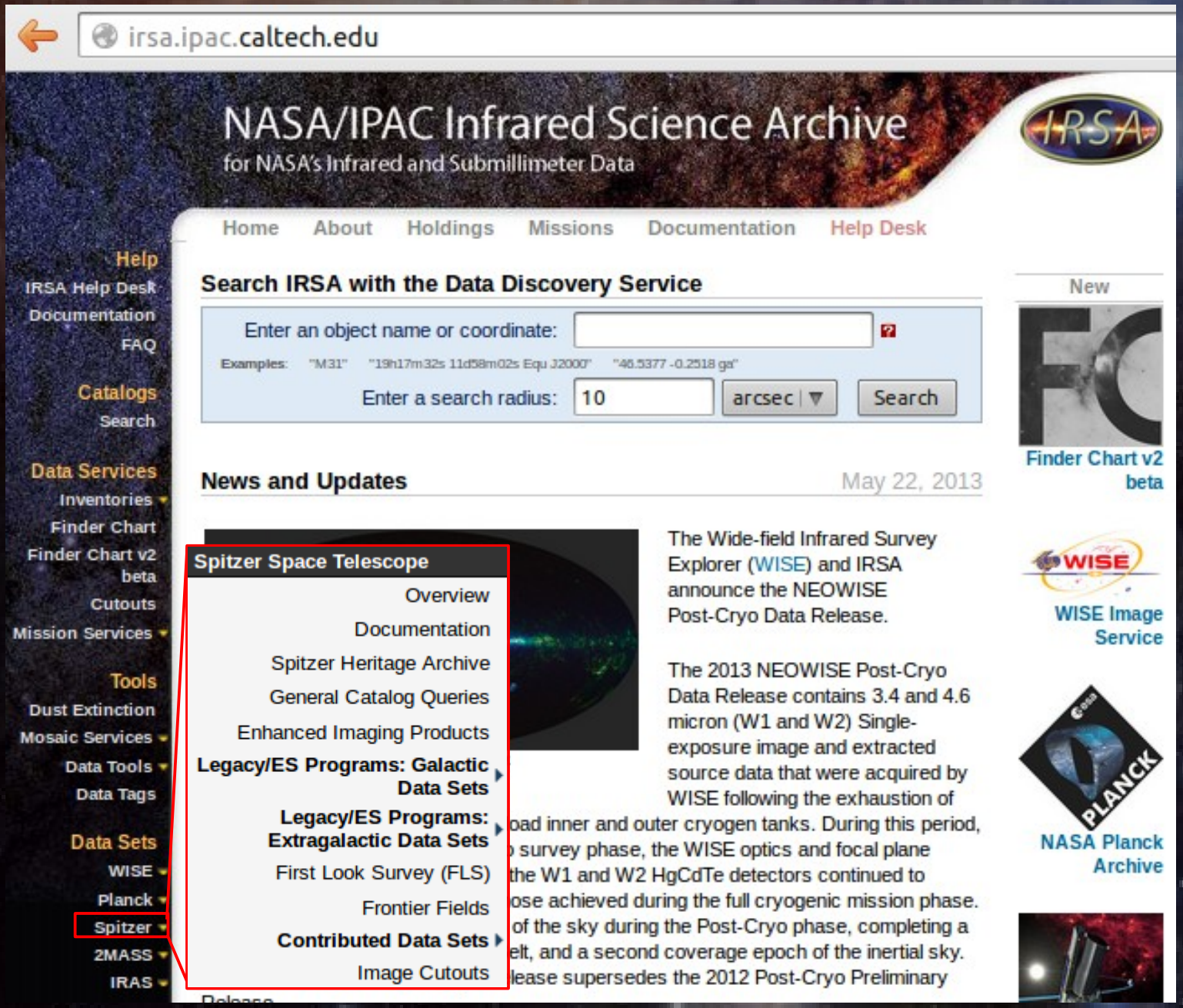

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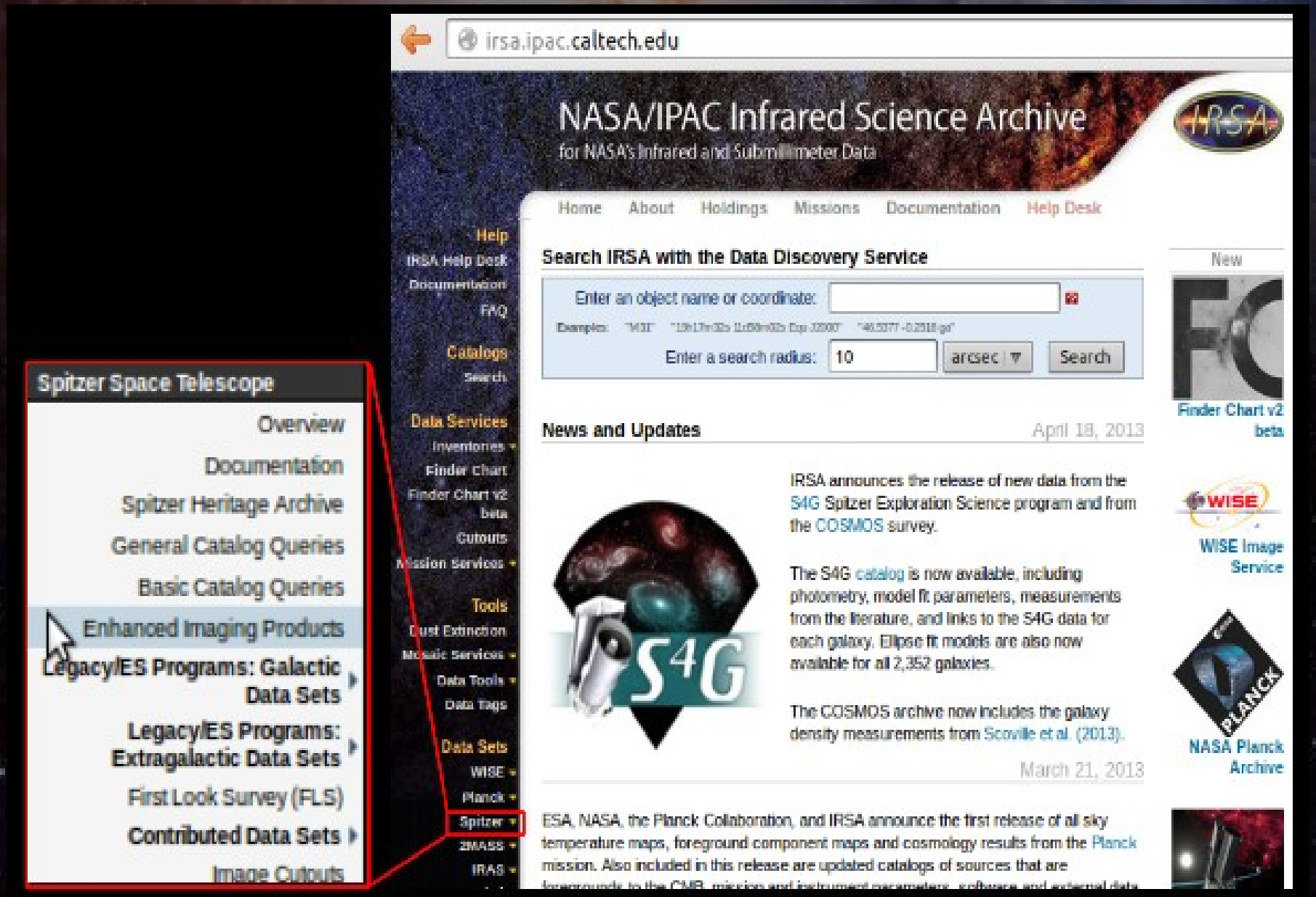
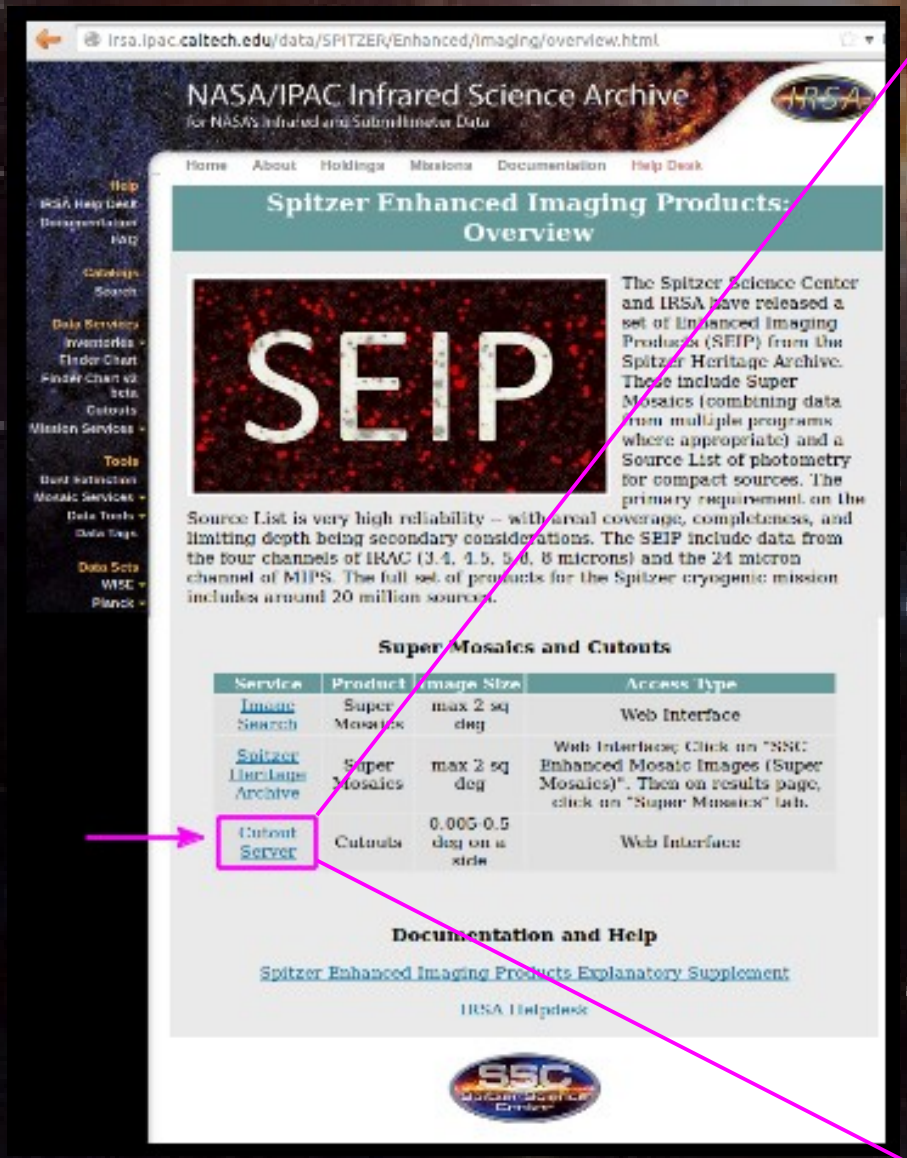


Spitzer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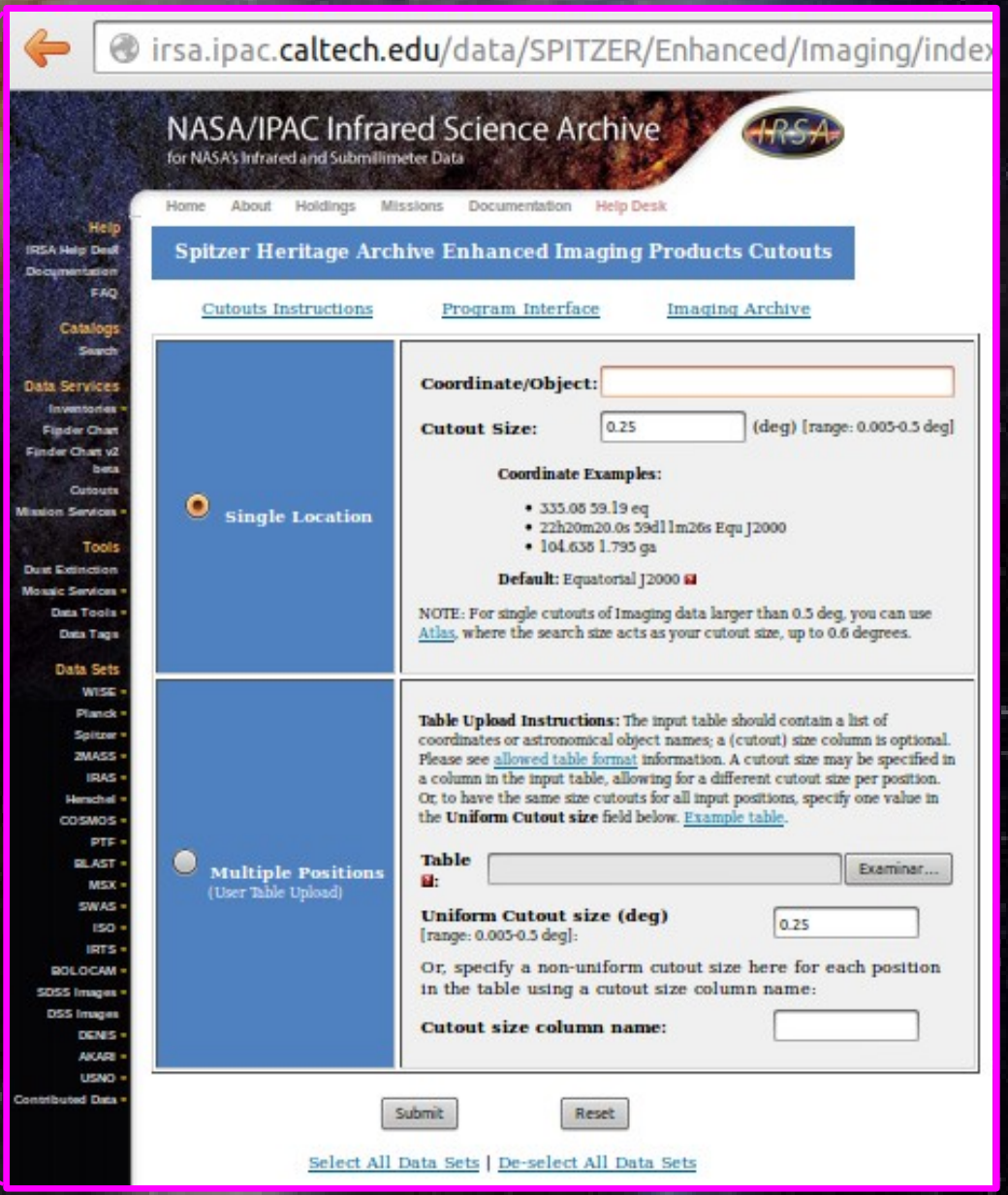
Spitzer Enhanced Imaging Products: Overview
SEIP
The Spitzer Science Center and IRSA have released a set of Enhanced Imaging Products (SEIP) from the Spitzer Heritage Archive. These include Super Mosaics (combining data from multiple programs where appropriate) and a Source List of photometry for compact 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, 5.8, 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 "SSC Enhanced Mosaic Images (Super Mosaics)". Then on results page, click on "Super Mosaics" tab.
Cutout Server
Cutouts
0.005-0.5 deg on a side
Web Interface
Documentation and Help
Spitzer Enhanced Imaging Products Explanatory Supplement
IRSA Helpdesk
SSC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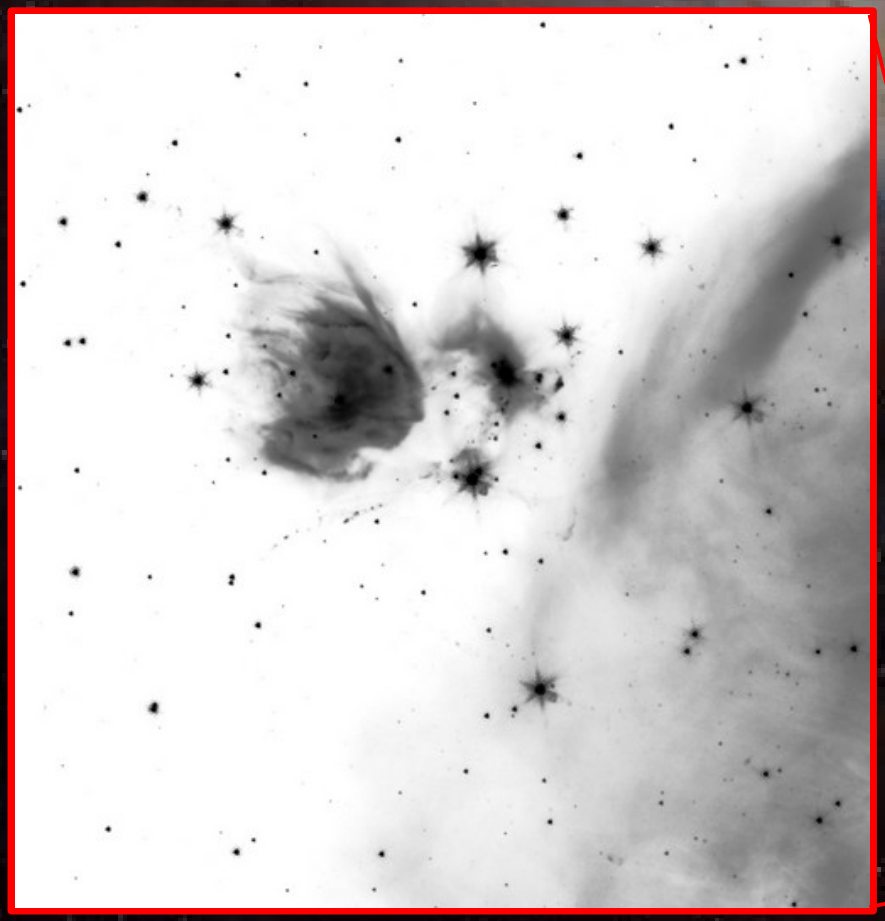
Spitzer Heritage Archive Enhanced Imaging Products Cutouts
Cutouts Instructions
Program Interface
Imaging Archive
Single Location
Coordinate/Object:
Cutout Size:
0.25
(deg) [range: 0.005-0.5 deg]
Coordinate Examples:
335.08 59.19 eq
22h20m20.0s 59d11m26s Equ J2000
104.638 1.795 ga
Default: Equatorial 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:
Examinar...
Uniform Cutout size (deg)
[range: 0.005-0.5 deg]:
0.25
Or, specify a non-uniform cutout size here for each position in the table using a cutout size column name:
Cutout size column name:
Submit
Reset
Select All Data Sets | De-select All Data Sets

Spitzer



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Data Tags

Data Sets
WISE
Planck
Spitzer
2MASS
IRAS
Herschel
COSMOS
PTF
BLAST
MSX
SWAS
ISO

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
Download Instructions	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.	
	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

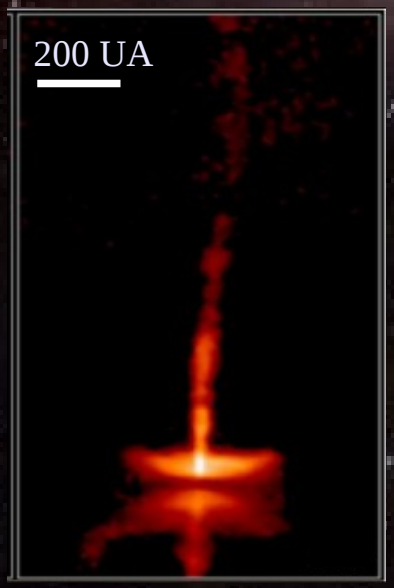
Quicklook	RA	Dec	Dataset	Original_Filename	Download
	246.61008000	-24.40833000	science	40015561.40015561-87-short.IRAC.4.mosaic.fits	To disk To OASIS
	246.61008000	-24.40833000	science	40015561.40015561-87.IRAC.3.mosaic.fits	To disk To OASIS
	246.61008000	-24.40833000	science	40015561.40015561-87-short.IRAC.3.median_mosaic.fits	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_{bol} < 650 K.
→ Procesos de acreción y eyección.

Óptico

HH 30

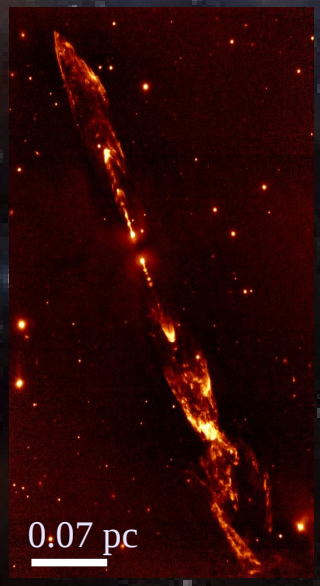


Hubble Space Telescope

- Hα → 6563 Å.
  [S II] → 6716 – 6731 Å.
- Colimación alta.
- V_{gas} = 100 – 500 Km.s^{-1}

Infrarrojo

HH 212

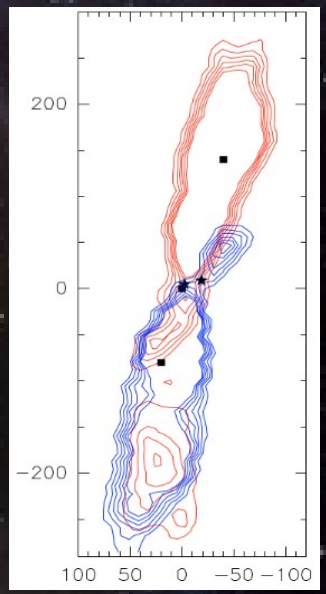


McCaughrean et al. (1994)

- H_2 → 2.12 μm.
  Spitzer → [3.6] μm y [4.5] μm.
- Colimación intermedia.
- V_{gas} = 50 – 100 Km.s^{-1}

Radio

BHR 71

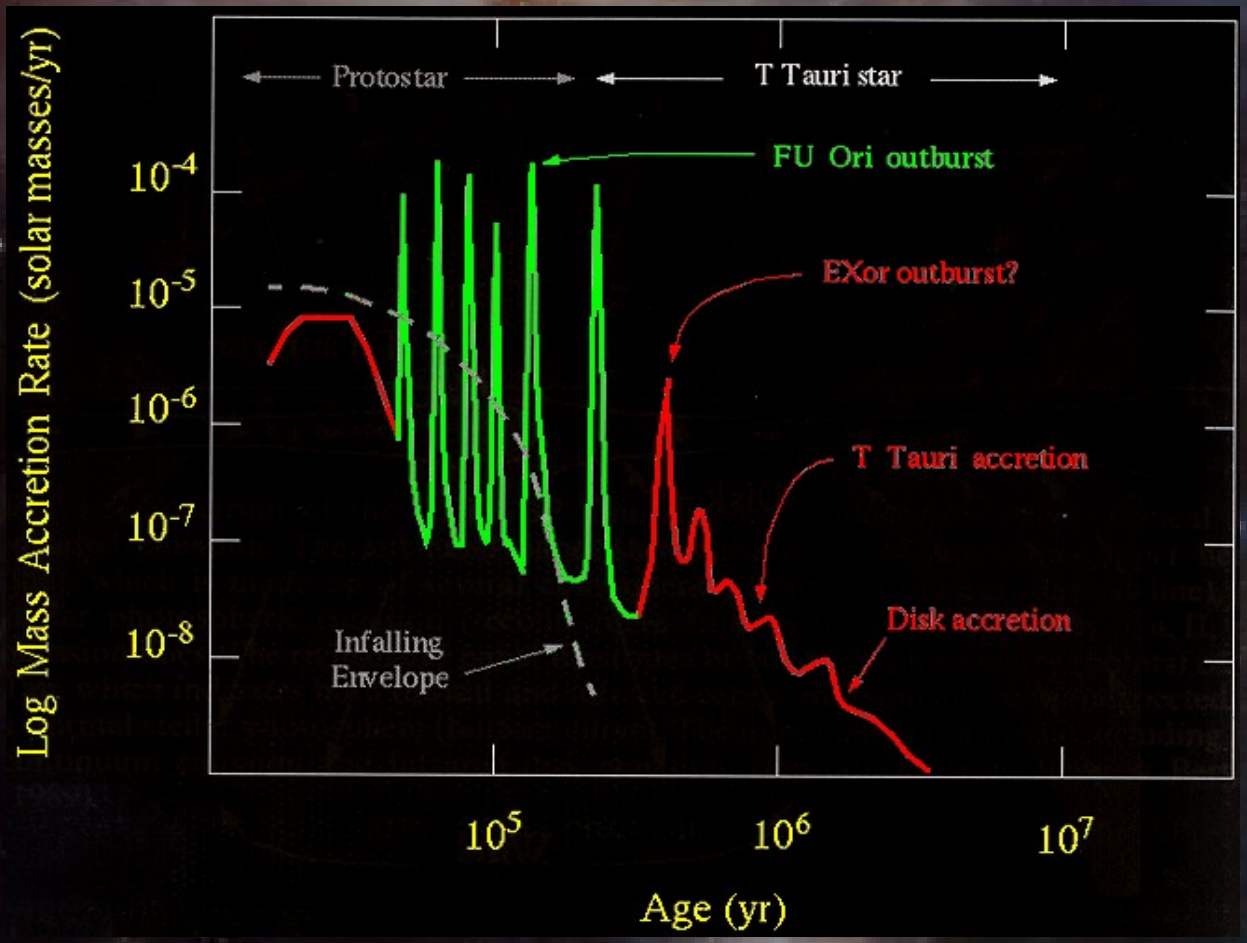


Parise et al. (2006)

- CO → 2.7 mm.
- Colimación pobre.
- V_{gas} < 50 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)

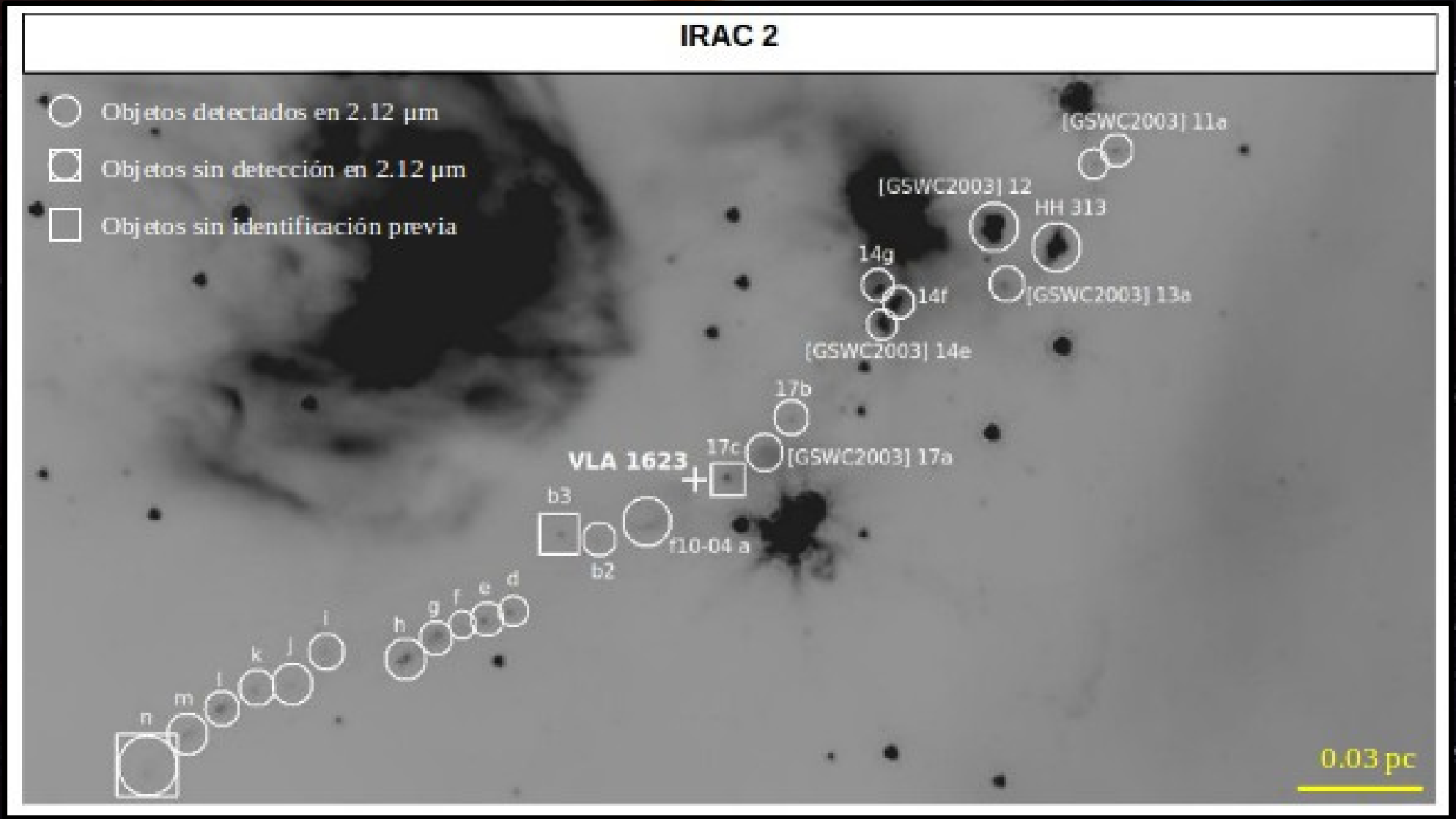
Resultados

VLA 1623

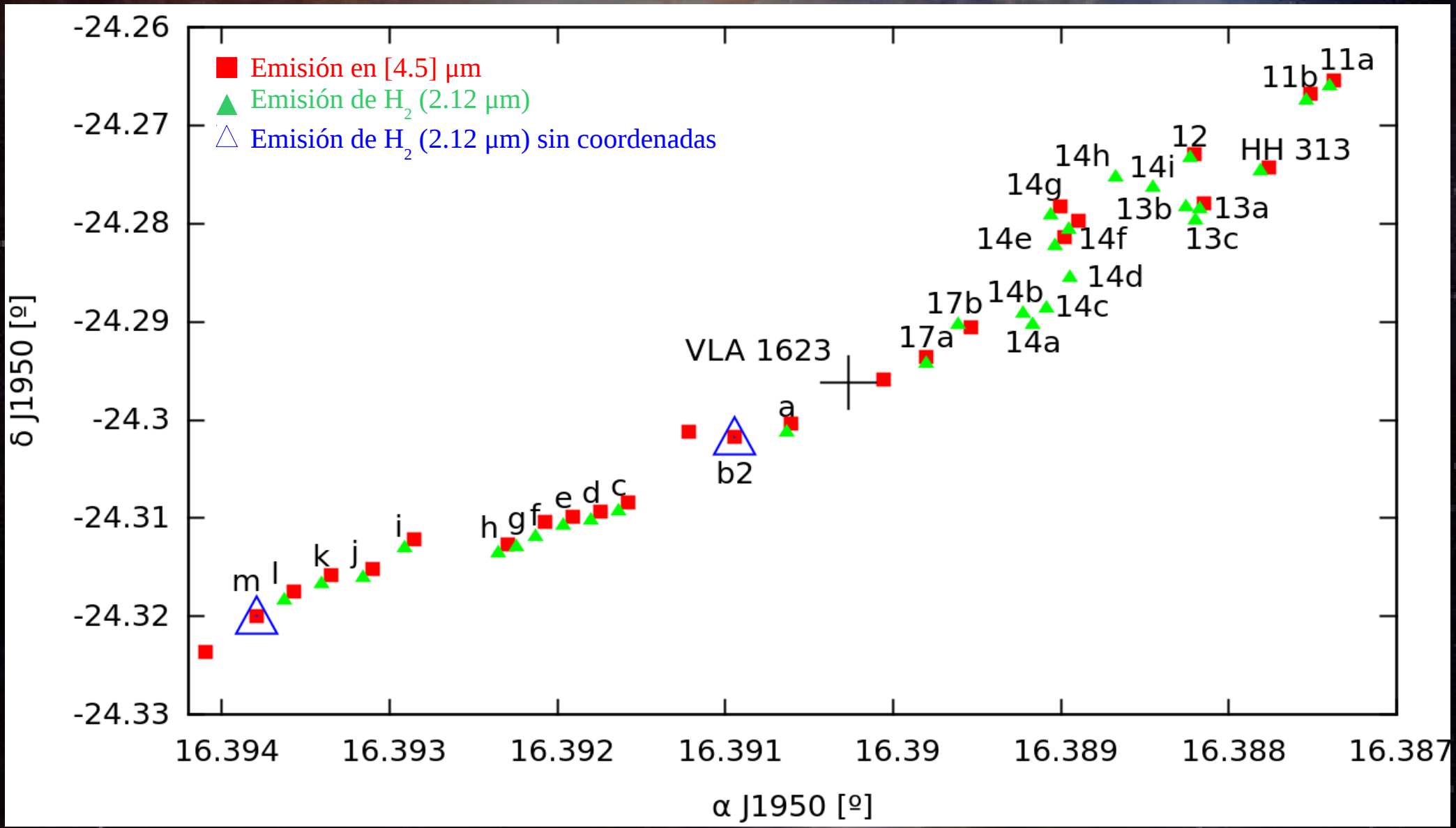
t_C = 225 años

Resultados

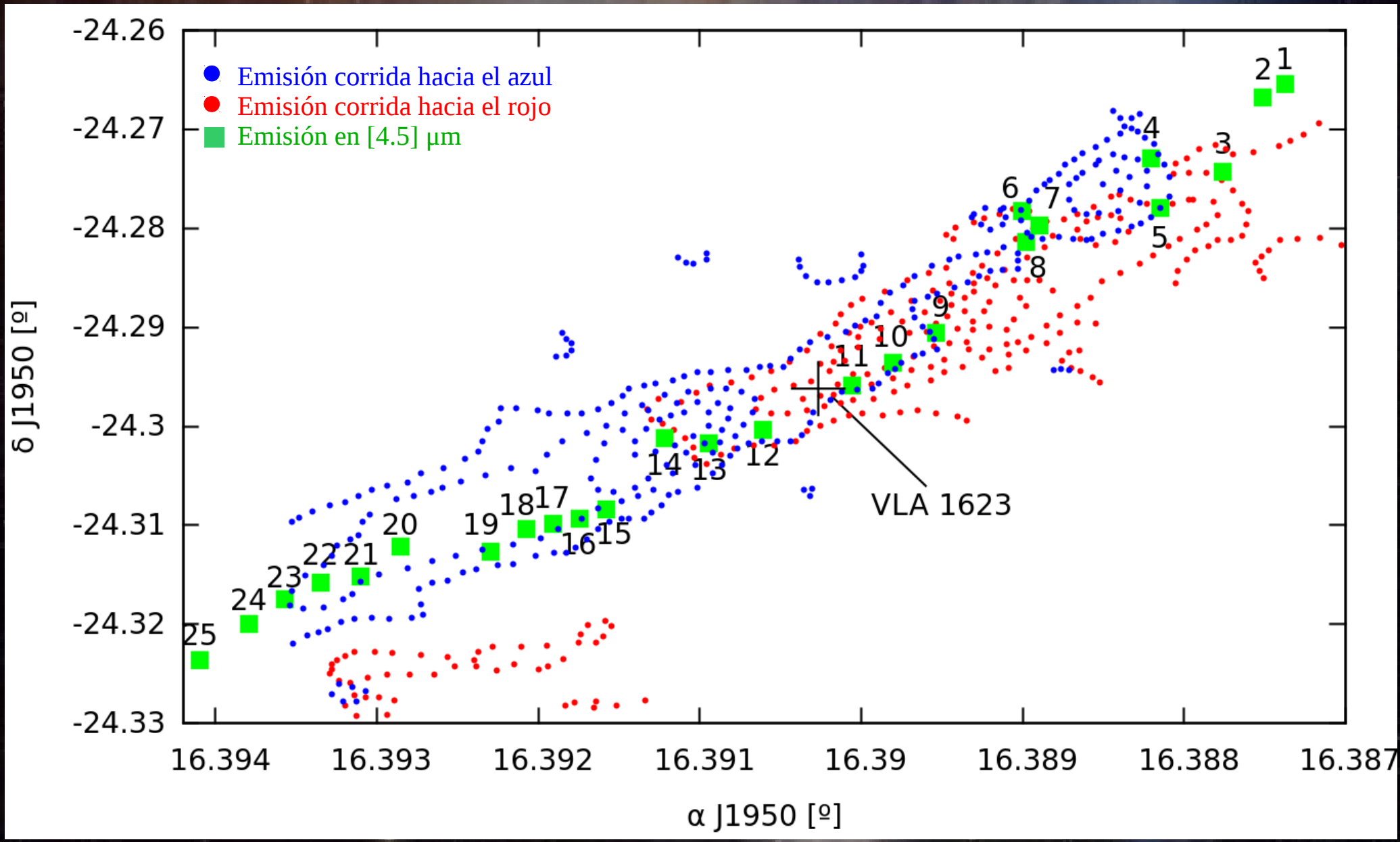
VLA 1623



Emisión en [4.5] μm y H_2 (2.12 μm)



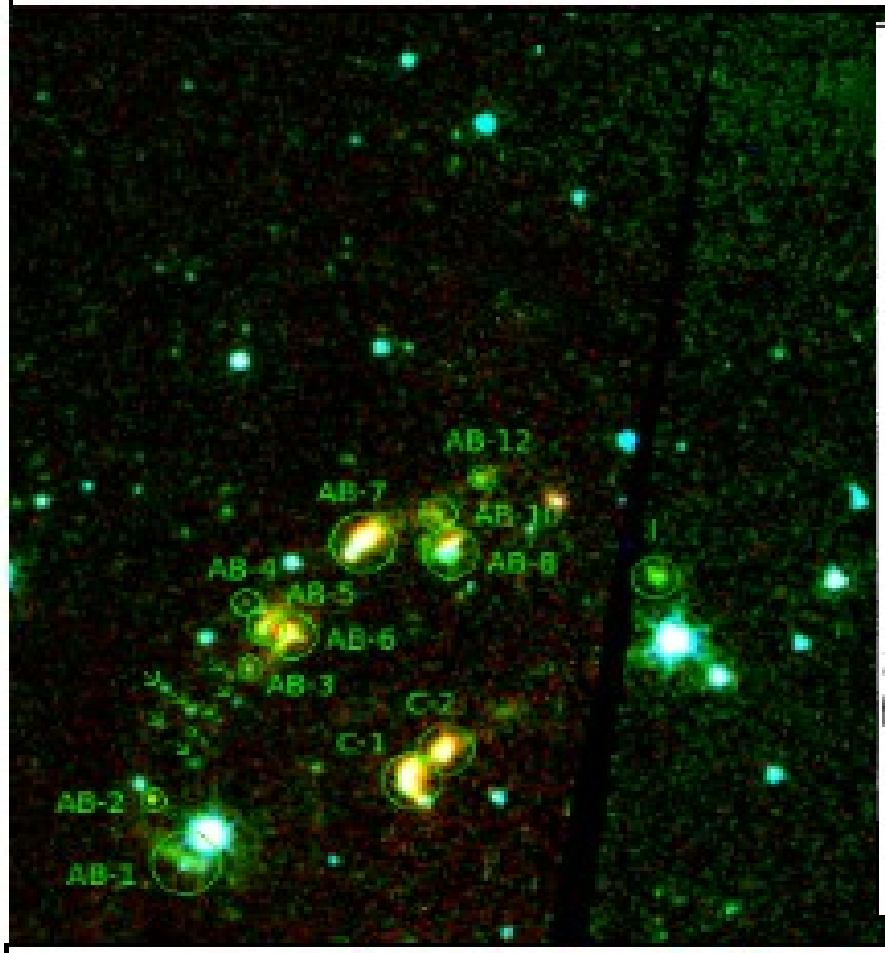
Emisión en CO y [4.5] µm



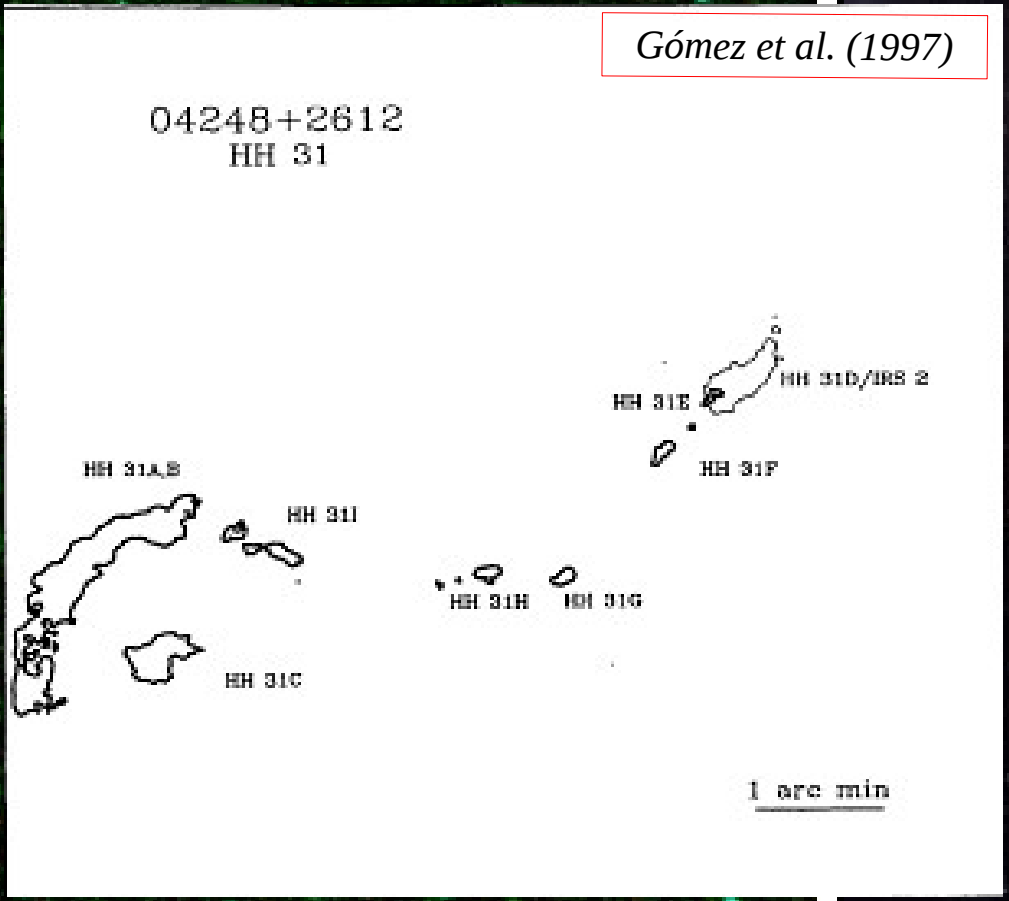
Resultados

HH 31

Spitzer

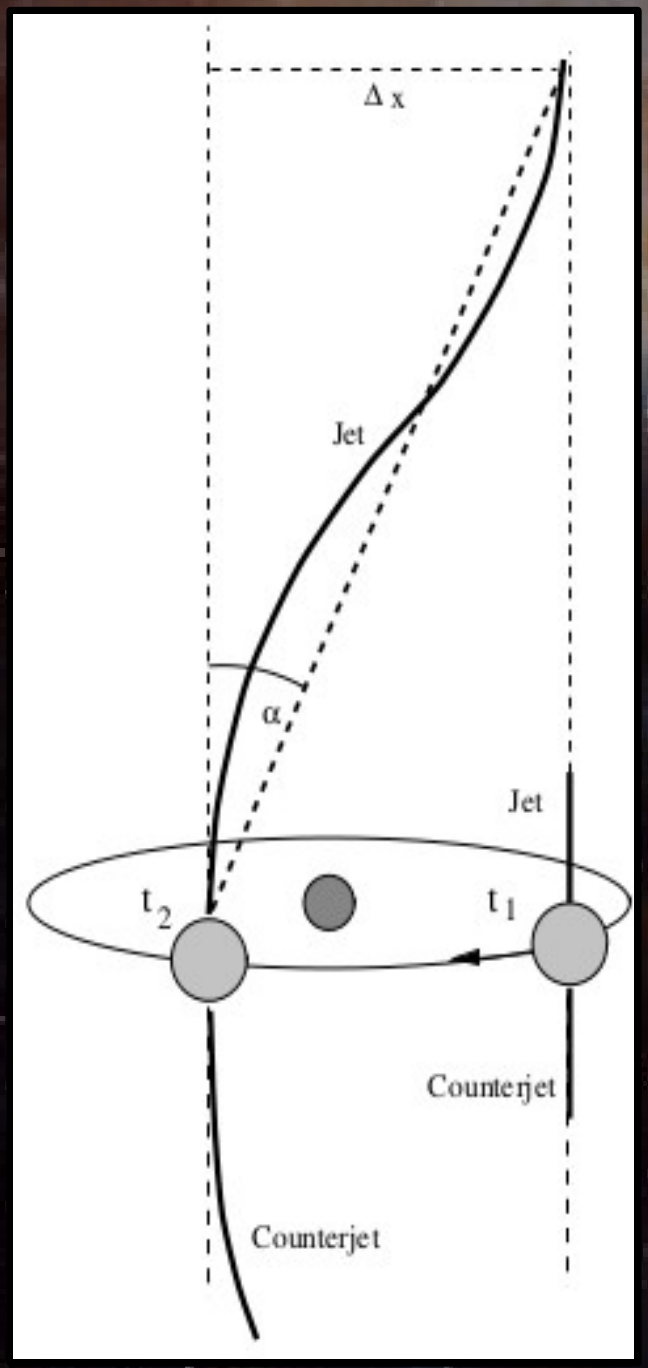


Gómez et al. (1997)



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 ~ 25 UA.
M = 0.07 $M_\odot$

→ **P = 472.5 años.**

$$t_c = l/v$$

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

→ **2.7 vueltas.**

Resultados

VLA 1623

Objeto	$\alpha_{J2000\ (medido)}$	$\delta_{J2000\ (medido)}$	$\alpha_{J2000\ (GGCs)}$	$\delta_{J2000\ (GGCs)}$
[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		
f1Ø-Ø4a	16 26 27.6	-24 24 45		
f1Ø-Ø4b2	16 26 28.8	-24 24 50		
f1Ø-Ø4b3	16 26 29.8	-24 24 48		
f1Ø-Ø4d	16 26 31.1	-24 25 14	16 26 31.1	-24 25 14
f1Ø-Ø4e	16 26 31.7	-24 25 17	16 26 31.7	-24 25 17
f1Ø-Ø4f	16 26 32.3	-24 25 19	16 26 32.3	-24 25 19
f1Ø-Ø4g	16 26 32.9	-24 25 21	16 26 32.9	-24 25 22
f1Ø-Ø4h	16 26 33.7	-24 25 29	16 26 33.7	-24 25 29
f1Ø-Ø4i	16 26 35.7	-24 25 27	16 26 35.7	-24 25 27
f1Ø-Ø4j	16 26 36.6	-24 25 38	16 26 36.6	-24 25 39
f1Ø-Ø4k	16 26 37.5	-24 25 40	16 26 37.5	-24 25 40
f1Ø-Ø4l	16 26 38.3	-24 25 46	16 26 38.3	-24 25 46
f1Ø-Ø4m	16 26 39.1	-24 25 55	16 26 39.2	-24 25 54
f1Ø-Ø4n	16 26 40.2	-24 26 08	16 26 40.2	-24 26 07

Zhang & Wang (2009)

IRAS 04248+2612

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!

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