Digging Deeper into the Herschel Science Archive

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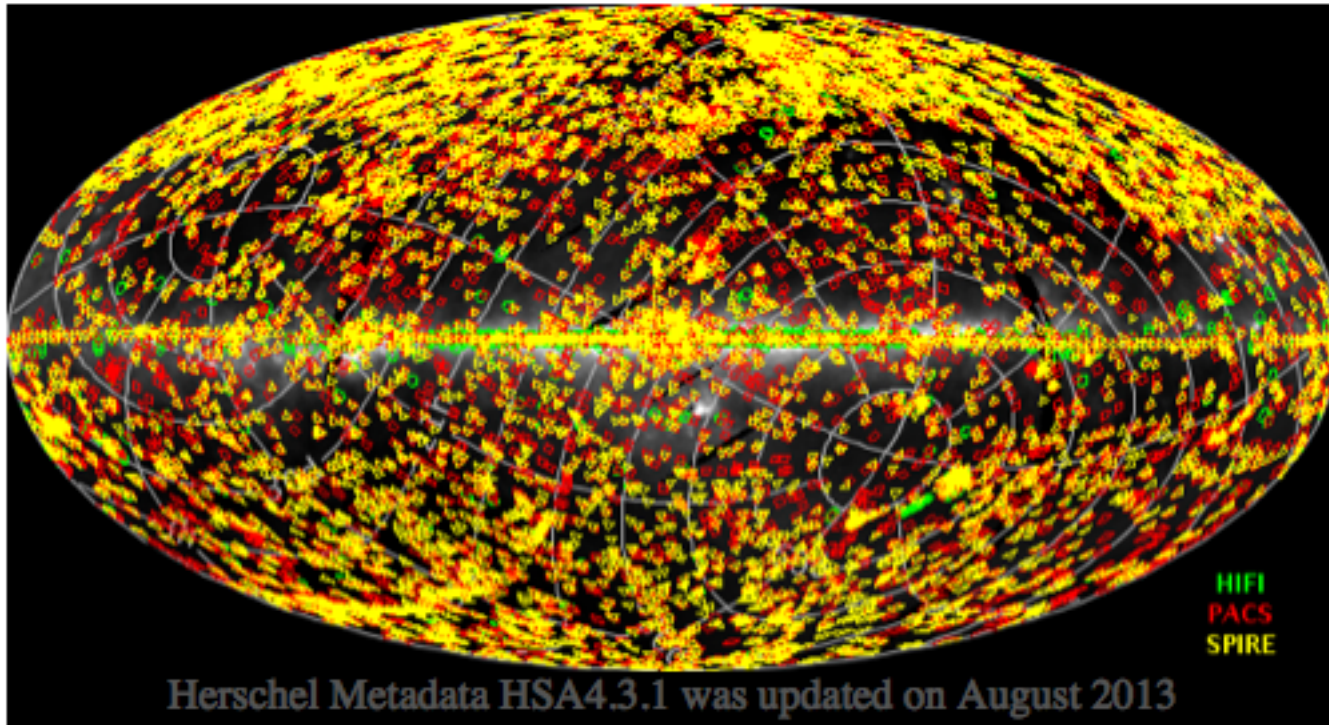## (based on talks by David Ardila)

Outline

- ## Pipeline-processed products
  - What's available
  - Using Observing Logs

- ## User-Provided Data Products (UPDPs)

- ## Accessing the data
  - HSA User Interface
  - Herschel Portal at IRSA

- ## Publication List

Looking at the Archive

Herschel Metadata HSA4.3.1 was updated on August 2013

- Over 60000 observations and over 20000 hours, but not full sky
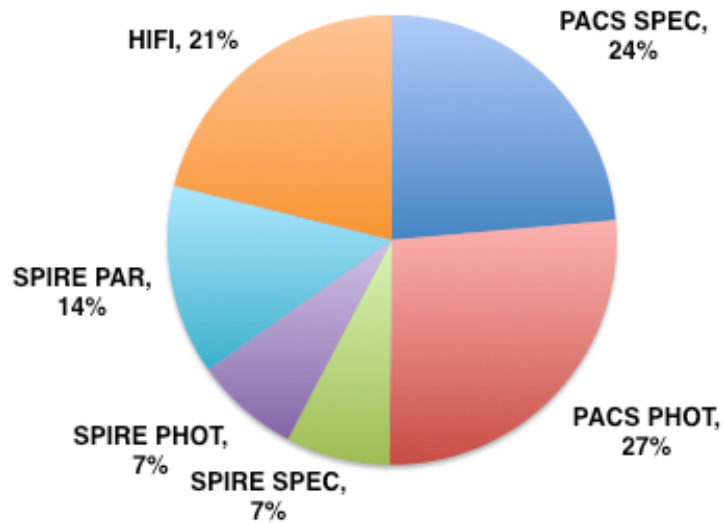- Everything is public six months after observed (except for some calibration observations)
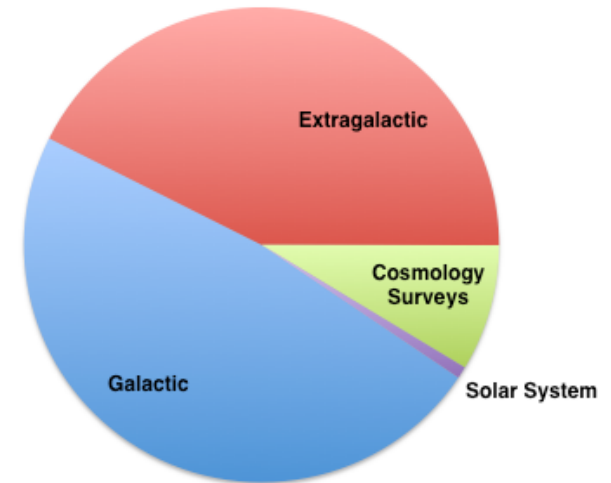
What's in the archive…

- ## Each observation done by Herschel

  – All are run through a reduction pipeline

  – The products of the pipeline may or may not be what you want. If you want to do photometry of isolated point source you are done!

- ## The user-provided data products (UPDPs) submitted by Key Programs

  – These can be anything: tables, images, 1D spectra

- ## You will not find catalogs (unless part of a UPDP) or extracted photometry or line measurements
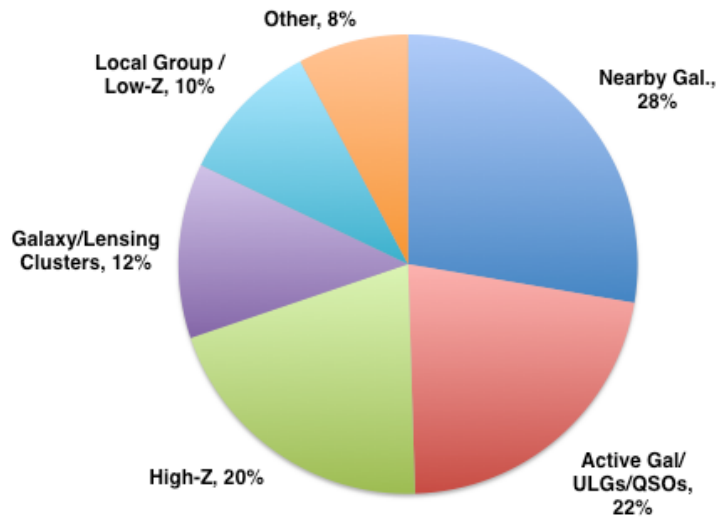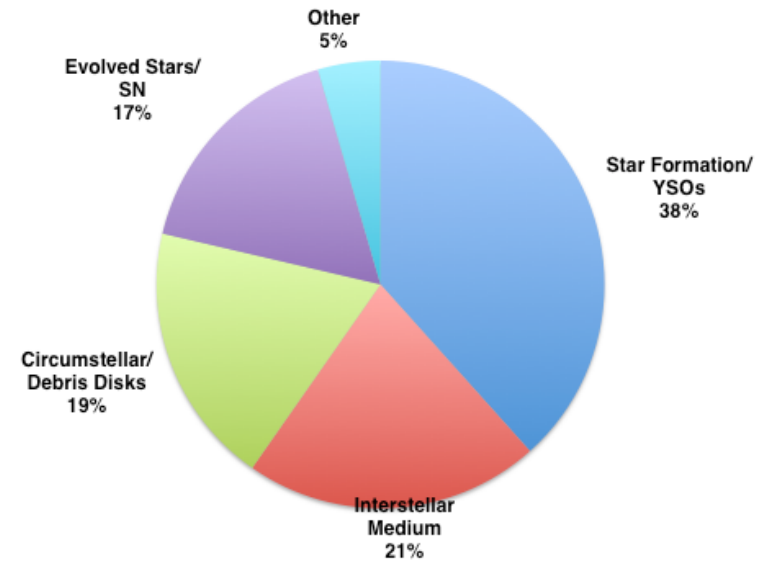
Instrument Distribution: 22694 hrs

- PACS SPEC, 24%
- HIFI, 21%
- SPIRE PAR, 14%
- SPIRE PHOT, 7%
- SPIRE SPEC, 7%
- PACS PHOT, 27%

Science Distribution (by hour)

- Extragalactic
- Cosmology Surveys
- Solar System
- Galactic

Extragalactic Science

- Other, 8%
- Local Group / Low-Z, 10%
- Galaxy/Lensing Clusters, 12%
- High-Z, 20%
- Nearby Gal., 28%
- Active Gal/ULGs/QSOs, 22%

Galactic Science

- Other 5%
- Evolved Stars/SN 17%
- Circumstellar/Debris Disks 19%
- Interstellar Medium 21%
- Star Formation/YSOs 38%

The Herschel Observing Log

Double-click on Observations

The Herschel Observing Log

Observing Log: good but limited…

No name
resolution

Searches by
science category!

Observing Log at Vizier

Vizier search by target

Name resolver for target
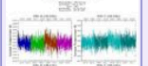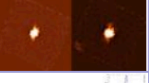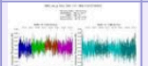
Tick the ObsId box! You'll want this later

Vizier output page

start AladinLite

Full	OD	Target	RAJ2000 "h:m:s"	DEJ2000 "d:m:s"	Proposal	Dur s	Start s	ObsId	PACS	HIFI	SPIRE
50	534	M82	09 55 52.22	+69 40 46.9	KPGT_rguesten_1	1933	2010-10-30T13:34:41	1342208586			
49	543	m82	09 55 52.22	+69 40 46.9	KPGT_cwilso01_1	17843	2010-11-08T01:58:26	1342208388			
48	543	m82	09 55 52.22	+69 40 46.9	KPGT_cwilso01_1	5041	2010-11-08T06:56:15	1342208389			
47	546	m82	09 55 52.22	+69 40 46.9	KPGT_cwilso01_1	3271	2010-11-10T20:17:56	1342209350			
46	546	m82	09 55 52.22	+69 40 46.9	KPGT_cwilso01_1	3271	2010-11-10T21:13:30	1342209351			
45	550	M82-outflow-south	09 55 56.00	+69 40 04.0	KPGT_esturm_1	1502	2010-11-15T05:03:08	1342208945			
44	550	M82-outflow-north	09 55 48.80	+69 41 27.0	KPGT_esturm_1	1502	2010-11-15T05:30:20	1342208946			
43	550	M82-outflow-north	09 55 48.80	+69 41 27.0	KPGT_esturm_1	1669	2010-11-15T05:57:30	1342208947			
42	560	M82-SW	09 55 49.44	+69 40 42.3	KPGT_rguesten_1	3697	2010-11-25T00:37:27	1342210062			
41	560	M82-NE	09 55 55.00	+69 40 51.5	KPGT_rguesten_1	3697	2010-11-25T01:40:47	1342210063			

Note: Calibration observations are not included

Key Programs

- 42 large programs submitted at the beginning of the mission. 40% of all time in Herschel.

- Two kinds:

  – Open Time Key Programs (KPOT - The community)

  – Guaranteed Time Key Programs (KPGT - Instrument groups)

- Required to produce User Provided Data Products (UPDPs) : High level products with custom processing.

Key Programmes at HSC website

Home	
General Information	▶
Documentation	▶
Observations	▶
Data Products	▶
Data Processing	▶
Publications	▶
User Services	▶
Herschel Helpdesk	

HERSCHEL OBSERVING KEY PROGRAMMES

INTRODUCTION

The Announcement of Opportunity (AO) for the Herschel Key Programmes (KP) was issued on 1 February 2007, with separate deadlines for guaranteed time (GT) and open time (OT) proposals. The whole Key Programme AO process has now been completed, by coincidence there is exactly the same number of KP GT and OT programmes, in both cases 21 programmes have been awarded observing time.

Taken together these 42 observing programmes contain 11650 AORs which form the current Reserved Observation List. The total allocated observing time for these programmes is 11257.7 hours, corresponding to approximately 57% of the nominally available Herschel routine mission science time. Some additional statistics are provided here.

Below you can find the list of accepted Guaranteed Time and Open Time Key Programmes sorted by Science Category. Click on the proposal ID's to access the text of the abstracts. These observations cannot be duplicated by future 'regular' programmes. If you want to check whether your planned observations are already covered by one or more existing AORs, you can easily do so by using the Herschel Reserved Observations Search Tool to find out.

GUARANTEED TIME KEY PROGRAMMES

For the Guaranteed Time (GT) part of the Key Programme AO a total of 21 Key Programmes were proposed and accepted (with some modifications). The total allocated observing time for these observing programmes contains 6668 AORs and amounts to 5878.9 hours, or approximately 93% of all available GT.

SOLAR SYSTEM (1)
KPGT_pharto01_1
"Water and Related Chemistry in the Solar System"
(PI: Paul Hartogh, 293.7 hours allocated)

ISM/STAR FORMATION (10)
KPGT_aabergel_1
"Evolution of interstellar dust"
(PI: Alain Abergel, 163.0 hours allocated)

KPGT_mgerin_1
"PRISMAS: PRobing InterStellar Molecules with Absorption line Studies"
(PI: Maryvonne Gerin, 128.0 hours allocated)

KPGT_vossenko_1
"The warm and dense ISM"
(PI: Volker Ossenkopf, 160.0 hours allocated)

There are counterparts to Spitzer Legacy programs

- Spitzer' SINGS (The Spitzer Infrared Nearby Galaxies Survey - Physics of the Star-Forming ISM and Galaxy Evolution) → Herschel Kingfish (Key Insights on Nearby Galaxies: A Far-Infrared Survey with Herschel)

- Spitzer's GLIMPSE and MIPSGAL → Herschel's Hi-Gal (The Herschel infrared Galactic Plane Survey)

- Spitzer's C2D → Herschel's DIGIT

- Spitzer's FEPS → Herschel's GASPS

Some UPDPs are already available

Cosmos » Herschel » Data Products » User Provided Data Products

| Home |
| General Information ▸ |
| Documentation ▸ |
| Observations ▸ |
| Data Products ▸ |
| Data Processing ▸ |
| Publications ▸ |
| User Services ▸ |
| Herschel Helpdesk |

HERSCHEL USER PROVIDED DATA PRODUCTS

INTRODUCTION

The Herschel Science Archive contains products obtained by processing the observations data through an automatic processing pipeline. This corrects well a number of instrumental artifacts in an automatic fashion. The final products can, however, be significantly improved by processing them further, e.g. by means of the interactive analysis software tools available within HIPE or with the help of other external tools and/or user contributed software.

The resulting products are called Highly Processed Data Products (HPDPs). In a broader sense this definition includes catalogues and atlases. In the future, the Herschel Science Archive is expected to be enhanced with the functionality for continuous ingestion of new user provided data products, catalogues and atlases, in the form of HPDPs.

In particular, and as agreed at the time of submission of the Key Programme observing proposals, KP consortia are committed to deliver to the HSC the User Provided Data Products corresponding to the data obtained as part of the Science Demonstration Phase. In addition, on a best effort basis, they are also expected to continue contributing with additional User Provided Data Products corresponding to the results obtained as part of their core programmes as they become published in the refereed literature.

For the moment, this web page is intended to play the role of a User Provided Data Products repository by providing links to those external sites (mostly via ftp repositories hosted by the consortia delivering the data) containing data generated by different projects (and associated documentation), that may eventually be ingested into the Herschel Science Archive.

USER PROVIDED DATA PRODUCTS

The table below provides access to the currently available User Provided Data Products sorted by release date:

Proposal ID	Proposal Name	Release Note	User Provided Data Products Repository	Related Publications	Latest update	Ingested in HSA ?
GT1_golofs01_4 GT2_jbouwman_3	SPIRE spectroscopy of protoplanetary disks	Data Release Note	Data Repository	van der Wiel et al. 2014	[27-Aug-2014]	YES
KPGT_soliver_1	HerMES	HerMES Release note	HerMES Data Release	HerMES related publications	[11-Jul-2014]	YES
	Physical Processes in the Interstellar	VNGS Release note (SPIRE data) VNGS Release	VNGS Data release (SPIRE data) and postcards VNGS Data	Bendo et al.	[10-	YES (PACS

There are several ways of accessing these datasets

- Some metadata can be accessed via the Observing Log
- Access via the Herschel User Interface (HUI)
- Access via the Herschel Interactive Processing Environment (HIPE)
- Access via the Herschel portal at IRSA
- Important: The Archive is not the Interface

I will

- The Herschel Observing Lo...
- The Herschel Archive User Interface
- The Herschel Interactive Analysis Environment (HIPE)
- HSPOT: The observation planning tool
- The Herschel Publications Tool

Using the Herschel Archive User Interface - HUI

Herschel Science Center webpage:
http://www.cosmos.esa.int/web/herschel/home

Click the Archive link: "Herschel Science Archive (HSA)"

HUI Search on target (M82)

1. Send to External Application -> All

The observation is in HIPE for browsing ("handle" only, not all the contents!)

2. Place observation in Shopping Basket, and submit request for Level-2

UPDP QUALITY REPORT 1342187206 M82   09h 55m 51.26s +69d 40' 23.10"   24.58arc... 194

START TIME: 2009-11-24 17:12:32	**Duration:** 4504.0	**URN:** 522229
INSTRUMENT: PACS	**OBS. MODE:** PacsLineSpec	
PROPOSAL: Calibration_pvpacs_80		
AOR: Calibration_PVSpecAotVal_1-PVSpecAotVal_521X_StdLineMap_63_...		
PROP STATUS: Public data	**EXPIRATION DATE:** 2009-11-24	
SPG: SPG v12.1.0	**Level:** LEVEL2_PROCESSED	**Status:**

Search | Shopping Basket ↗ − ✕ | Observations #3

Observations

[1 Observations]

Retrieve | On Demand Reprocessing

	All ▼	Observation	Target Name	RA	DEC
☑	Level2 ▼	1342187206	M82	09h 55m 51.26s	+69d 40' 23.10"

You will receive an email when the download is ready

Dear HSA User,

Your retrieval request has been successfully processed.
The data may be retrieved from the following address where
they will remain for 3 days.

You can access your files online from the browser at:
http://archives.esac.esa.int/hsa/ftp_public/dshupe204282201/dshupe204282201.tar.gz

The total size of the requested files is 165.0 MB (173285302 bytes).
The list of files which have been copied is attached
at the bottom of this message.

You can get more information about the Herschel project by
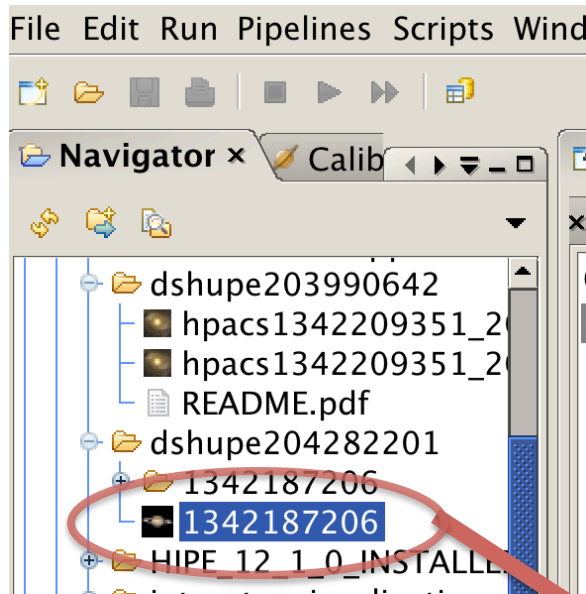accessing the Herschel web pages from the following URL:

   http://herschel.esac.esa.int

Best Regards,

The Herschel Science Data Archive team

The following files have been copied (limit to 1000 products):
==

/hsa/oper/hsa_oper_repository/request_files/v12.1.0/1342187206-herschel.ia.obs.ObservationContext-522229.xml
/hsa/oper/hsa_oper_repository/images/v12.1.0/1342187206-herschel.ia.obs.ObservationContext-522229.jpg

After downloading tarball, unpack and double-click Saturn icon

1. Double-click the Saturn icon…

2. …then double-click in Variables on obsid_1342187206

Data are downloaded in standard FITS files

These directories are:
- BIG: 500 MB for a small PACS observation, if you download all the products
- Take a long time to download
- With these method, you should download only individual levels
- The whole thing is called an Observation Context
- The folders within are called products

The FITS are multi-extension files

- Example: This typical PACS level-2 file has 8 extensions (four images and four tables)

FV output

The HUI allows you to peruse and search User Provide Data Products

Some (current) limitations of the HUI

- Simple point-within-circle search
  - Footprints are being worked on

- No searches by any spectral variable (wavelength, frequency, band)
  - Coming soon in new HSA/HUI versions

- Standalone products are incomplete for e.g. PACS spectroscopy
  - Solution: Send to HIPE

Approved Programs

The Herschel portal at IRSA

- IRSA is the NASA Infrared Science Archive

- The Herschel portal is available from the IRSA page
  - Searches the Archive
  - Provides an interface for UPDP
  - It will allow direct inspection independently of HIPE
  - Cross-mission comparison!
  - Caveat: currently searches map centers only

esa   **Herschel Data Search**

Herschel Metadata HSA5.2.1 was updated in May 2014
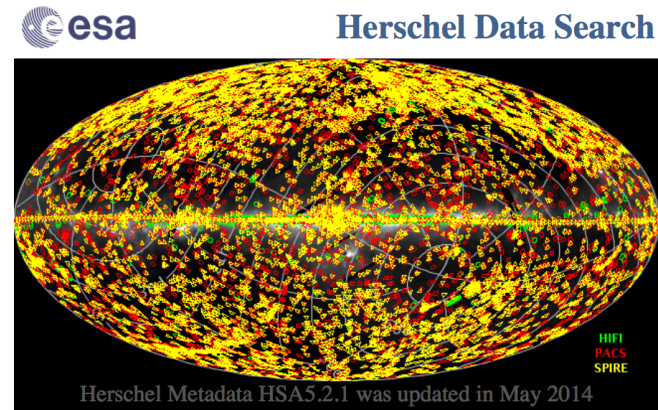
This web interface allows users to find data in the *Herschel Science Archive (HSA)* maintained by ESA at the European Space Astronomy Centre, and provides links to the data retrieval through the HSA's Virtual Observatory interface. The archive can also be accessed from ESA's Herschel Science Archive interface. An observation log of all Herschel science observations is also available. Additional information about the mission and the instruments can be found on the NASA Herschel Science Center webpages and on ESA's Herschel Science Centre webpages.

The cone and box searches below return all images with RA and DEC header keywords (usually the image center) lying within the specified search region. These searches may not return all images that partially overlap some part of the search region or all images that overlap the center of the search region.

⦿ Cone Search   ◯ Box Search   ◯ Multi-Position Search   ◯ All Sky

Coordinate/Object   **Radius**

[   ] [?]   [30   ] [arcmin ⇕]

Examples: 0 0 gal | M42   radius ≤ 5.0 deg

The Herschel portal at IRSA

How to find out what's been published?

Visualizing Observations

HSpot   NHSC Additional Software

Archives

Herschel Science Archive   Herschel portal at IRSA   User Provided Data Products

Refereed Publications

Papers in the ADS   Herschel Publications Tool

Links to refereed papers. These are manually vetted!

Publications list

- Refereed publications after launch
- Hand-checked

Publication List

Last update: 2013.08.07 T 11:13:43 CEST

▼ Filter

Publication criteria			Observation criteria	
Bib Code			OD range	=>
Title				
Author Surnames			Target	
Affiliation			Proposal	
			AOT / Instrument / SubInstrument	HifiFS / HifiMapping / HifiPoint / PacsLineSpec, PACS / SPIRE / PARALLEL / HIFI, P_SPEC / P_PHOT / P_ENG / S_SPEC
Journal	Any			
Min citations				
Publication Date	=>		Duration (min/max)	=>
Observation Ids			Start/End Time Range	=>
Status	Any			
User Reduced Data	Spectra / Catalog / Images		Science Area & Category	Solar System / Interstellar Medium/Star Formation / Stars & Stellar Evolution / Galaxies/AGNs, Active galaxies/ULGs/QSOs / Asteroids / Brown Dwarfs/Very Low-Mass Sta / Circumstellar/Debris disks
HIPE version				
Comments				
Abstract				

(Search publications) (Clear)

Publications per page [1000 ‡]

744 items found, displaying all items.

BibCode	Status	Title	Authors	Journal	Date	Citations	#Obs
2013RvMP...85.1021T	PENDING	The molecular universe	Tielens A. G. G. M.	Reviews of Modern Physics	07/2013	0	0
2013RAA....13..557H	IN_PROGRESS	Sequential clustering of star formations in IC 1396	Huang Y.-F., Li J.-Z.	Research in Astronomy and Astrophysics	05/2013	1	0
2013RAA....13..179L	DONE	Far-Infrared and submillimeter properties of SDSS galaxies in the Herschel ATLAS science demonstration phase field	Lam M. I., Wu H., Zhu Y.-N., Zhou Z.-M.	Research in Astronomy and Astrophysics	02/2013	0	2
2013PASP..125..600M	PENDING	An Overview of the Dwarf Galaxy	Madden S. C., Rémy-Ruyer A., Galametz M., Cormier	Publications of the	06/2013	0	0

Things that will be possible within 6 months

- I want to find all PACS observations of the CII line for list of targets:
  - HSA 6.1 will allow for much more sophisticated searches.

Learn more!

- ## Lots of videos in YouTube HIPE Academy

Summary

- A list of all observations is available from the Observing Log

- Vizier provides a convenient search of all science observations

- Data can be downloaded from HUI using
  - "Retrieve Data" -> Tarball. Big. Can use to retrieve fragments of observation context only.
  - "Send to External Application" -> send to HIPE (reference pointers only aka 'lazy loading'). Good for inspection and reduction.

- Herschel portal at IRSA provides a familiar interface and cross-correlation with other holdings

- UPDPs available through webpage, HUI, IRSA

- Publications list links papers to datasets