Quick Start Guide

1. Preface

The purpose of this document is to help you get started using HIPE with the minimum of fuss, confusion, time wasted, and Helpdesk (please open this link in a new tab or window) tickets raised.

This document assumes the following:

- You have installed HIPE without any issues.

- You have registered with the Herschel system. Go to Herschel registration page (please open this link in a new tab or window) if not.

- You have an account with permission to access the Herschel Science Archive (HSA).

- You know the observation ID for at least one set of data.

By the end of this document you will have achieved the following:

- Transferred one observation for inspection from the HSA into your HIPE session.

- Developed a broad understanding of the data structure that you see.

- Learnt how to look at your data.

- Begun to have an understanding of where you can go from here, and where in the documentation to look next.

The first step after checking both lists (especially the first one) is to launch the main program of HIPE. Being a cross-platform application, instructions for the major operating systems follow:

- *Linux and UNIX:* You will find links to the executable file according to the choices made during installation. The options are: the home directory (default), a specific directory and no links (you will have to execute the application directly from the installation directory). If you are running the program from the terminal you should type `hipe` or `./hipe` depending on the shell.

- *Mac OS X:* After installation, you will find HIPE on the Desktop. It is also available searching for `hipe` in Spotlight and at the installation directory.

- *Windows:* After installation, you will find HIPE on the Start Menu (or Start Screen in Windows 8), on the Desktop (if you decided to create shortcuts there) or directly at the installation directory.

In any of the previous cases, when you locate the link or executable file double click it to run the program.

Clicking in HIPE

Click behaviour within HIPE is very similar to any other GUI-based application:

- One click for selection/highlighting.

- Double click for expanding a tree (for example, the *Navigator* view or the *Tasks* view) or accessing a detail view (a data viewer when double-clicking a product in the *Observations* list).

You will *not* have transferred data onto your hard disk. To learn how to do this see the *Data Analysis Guide*: Section 1.2 in *Data Analysis Guide*.

This document is intended to be read as you carry out these actions in HIPE. It does not describe any of the other views you see in the main HIPE window. For that, please see the *HIPE Owner's Guide*.

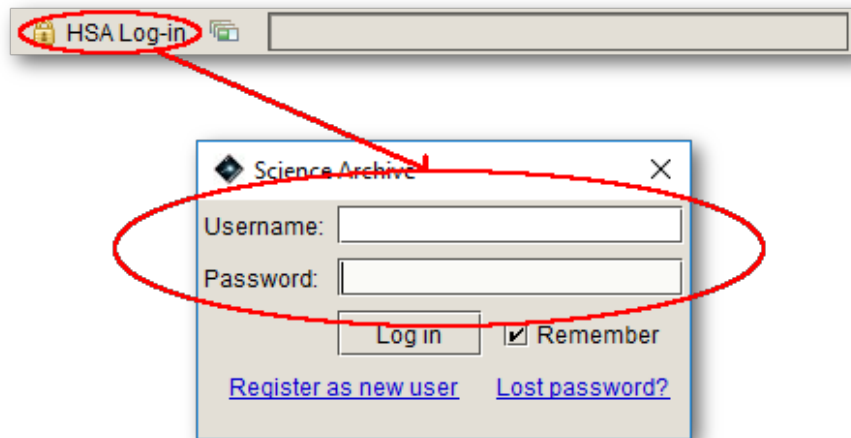# 2. Access the Herschel Science Archive

To easily access data stored in the archive, you must first ensure that, within HIPE, you are logged in the Herschel Science Archive (HSA). Typically this must be done only once.

Check your login status by inspecting the HIPE status bar at the bottom. If you are not logged in, the text "HSA Log-in" will be visible as shown in Figure 1. Double-click on this part of the status bar and enter your Herschel username and password. Tick the *Remember* checkbox if you want HIPE to store your credentials securely--then you won't have to re-enter your login and password in future HIPE sessions.

Note

Please note that if you ever change or reset the password of the HSA account and you chose the option to remember the credentials, those old credentials will still be stored in your system. Therefore HIPE will consider your account as logged in, and this could then can result in permission errors when querying the HSA. In this case, you should explicitly log out by double-clicking your username in the bottom status bar. After this, you can double-click again to log in again, using the current password, or you can wait until HIPE prompts you to log in.

Figure 1. Logging in to the Herschel Science Archive

Once you have logged into the archive, you can move to the Welcome page (see below).
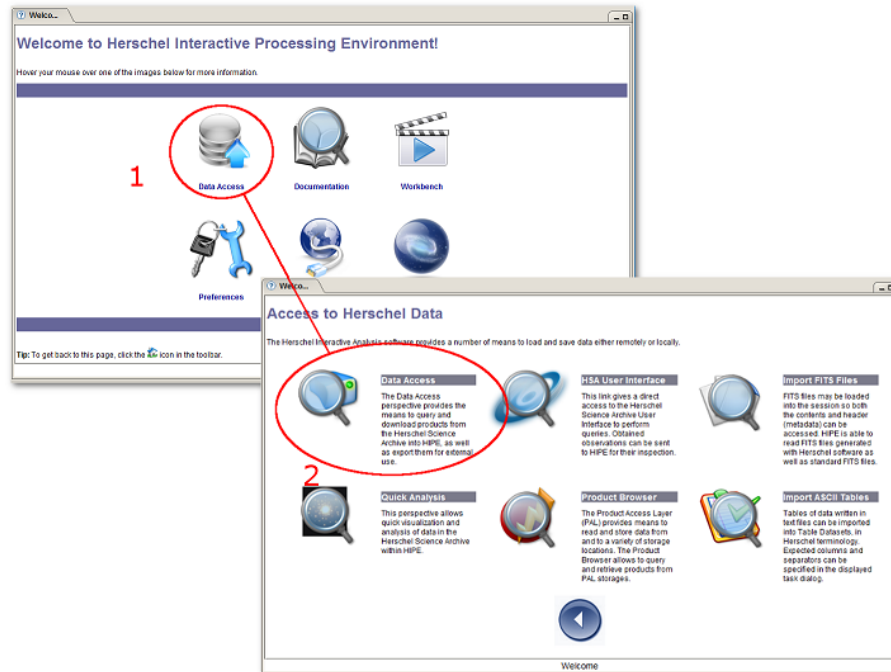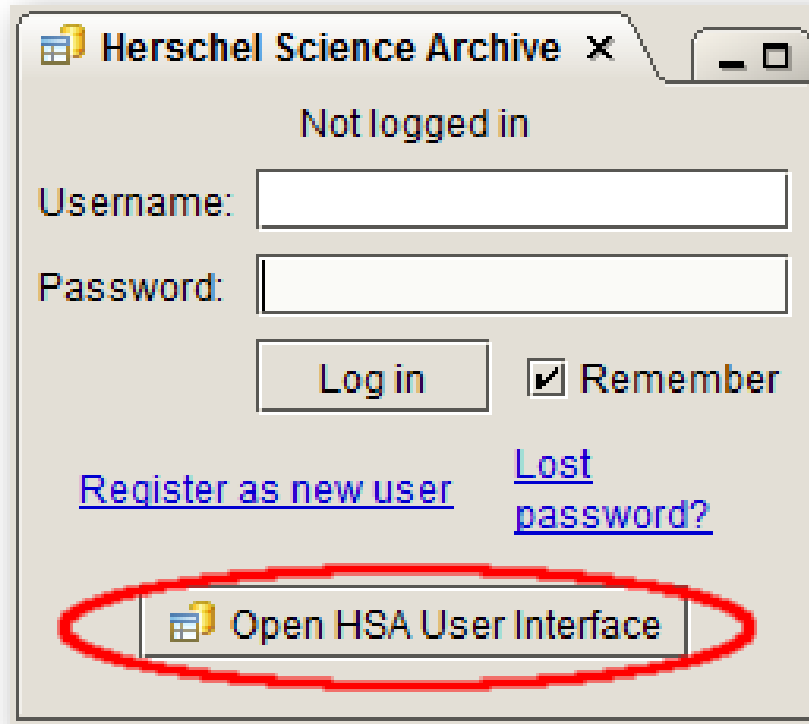
Figure 2. Accessing the Herschel Science Archive

Starting on the *Welcome* page (the default view on first opening HIPE), click on *Data Access*. In the *Access to Herschel Data* view that appears, click *Data Access* again (see Figure 2). This launches the Data Access perspective, a comprehensive set of components to handle data downloaded from the Archive. Among these components you will find the *Herschel Science Archive* view. Clicking on *Open HSA User Interface* will launch the archive interface.

Tip

If you cannot see the *Welcome* page, click the icon at the top right corner of the HIPE main window. Also, in the same toolbar to the left, you can always find an icon that instantly launches the HSA interface.

Figure 3. The HSA view

In the *Herschel Science Archive* view, click *Open HSA User Interface* to launch the HSA application. You may need to accept the security certificate (see Figure 3).

> **Tip**
>
> If you cannot find the *Open HSA User Interface* button in the HIPE window, go to the top-level menu item *Window → Show View → Data Access → Herschel Science Archive*.

3. Query the HSA

Figure 4. Querying the HSA (search)

Figure 5. Querying the HSA (results)

These steps are performed in the HSA web application, which is not part of HIPE but communicates with it (see above).

Tip

If you encounter problems with the HSA web application, or in any other point of the procedure using the graphical interface, you can also retrieve an observation via the command line. See the end of Section 4 for more details.

Enter a valid observation ID in the *Observation id* field. To access this field, you need to expand the *Observation constraints* section by clicking on its title. Click on the *Search* button: you should obtain one result in a new screen (switching screens is done via the left menu bar). Click the download icon in the result line, then choose *All* from the *Download Products* dialogue.

Since any observation ID is unique, it is all you need to know to find your data. You can also do more involved queries, for instance per instrument and/or observing mode.

4. Get the data into HIPE
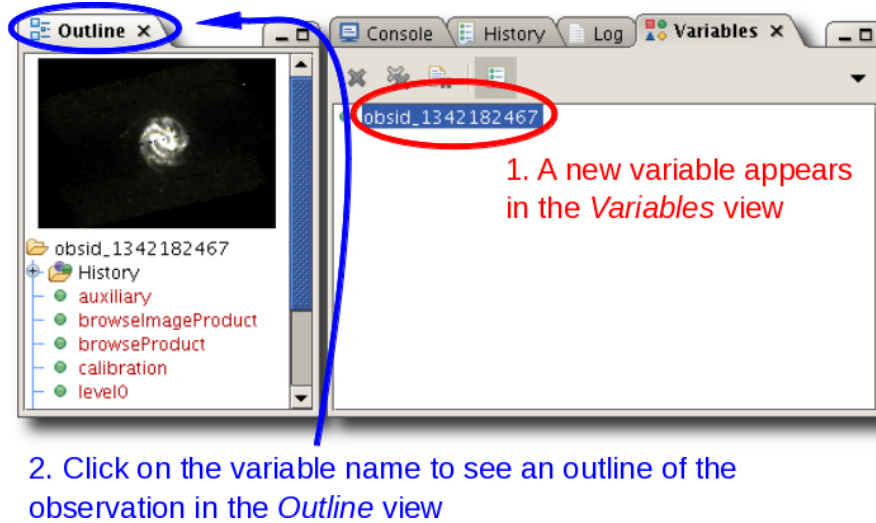
Figure 6. Loading data into HIPE

Back in HIPE, data are automatically imported and appear as a new variable in the *Variables* view (see Figure 6). The variable name contains the ID of your observation. Click on the variable to see an outline of the observation in the *Outline* view.

> **Tip**
>
> If you cannot see the *Variables* or *Outline* views, open them via the *Window → Show View → Workbench* menu.
>
> Note that the views could be in a different position than shown in Figure 6. To restore all the views to their default positions, click the ⬆ icon at the top right corner of the HIPE main window, and click *Yes* in the dialogue window that appears.

You can also retrieve the data via the command line. To do so, follow these steps:

1. Make sure you are logged into the Herschel Science Archive. See Section 2 for details.

2. Issue the following command in the *Console* view of HIPE:

   ```
   myObsid = 1342180473
   ```

   You can use any variable name instead of *myObsid*. Replace 1342180473 with the actual ID of your observation. If you cannot see the *Console* view, open it by choosing *Window → Show View → Workbench → Console*.

3. Issue the following command in the *Console* view of HIPE:

   ```
   myObs = getObservation(obsid=myObsid, useHsa=True)
   ```

   A new variable *myObs* appears in the *Variables* view. This is a reference to your observation, just like you would obtain by using the HSA application.

The method described above is ideal for inspecting data quickly, but does not store data on your machine. The recommended way to download and save data from the HSA is to use the getObservation task with the save=True parameter, or to download a tar file from the HSA and then use the getObservation task to load it into HIPE. See the *Data Analysis Guide* for details: Section 1.2 in *Data Analysis Guide*.

5. Inspect your data
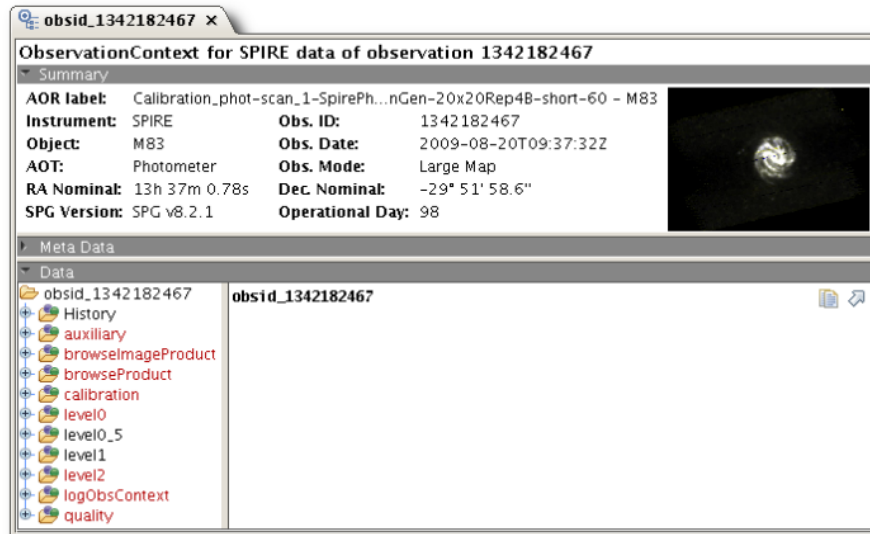
• Right click on your data in the *Variables* view (here *obsid_1342182467*).
• Choose *Open With → Observation Viewer*.
• The Observation Viewer opens in the *Editor* view.
• Use it to browse and inspect your data.

Figure 7. Inspecting an observation

You can navigate through and inspect the contents of your observation using the *Observation Viewer* .

To look at your Level 2 data, click on the Level 2 product in the lower left area of the Observation Viewer. The Level 2 product contains other products, which can themselves contain other products. This onion skin arrangement of products is represented in the Observation Viewer by a hierarchical structure. The data you want are right in the middle of the onion, so click on through until you reach the bottom product. Inside that you will find your data.
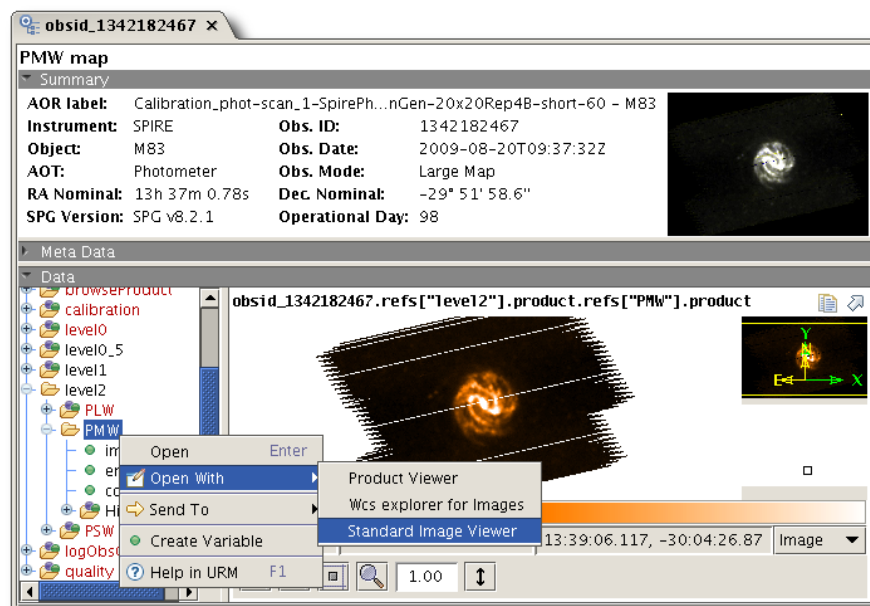

Figure 8. Opening an image with the Standard Image Viewer

Typically, double clicking on a product opens the data in the most appropriate tool with which to view them. You can also right click and choose a specific viewer from the *Open With* menu. The following are the two viewers you are likely to use most often:

- Spectrum Explorer in *Data Analysis Guide*, for single point spectra and spectral cubes (all instruments).

- Standard Image Viewer in *Data Analysis Guide*, for PACS and SPIRE photometry.

What is an Observation Context?

All Herschel observations are packaged as *Observation Contexts*. An Observation Context contains all the meta data and data products associated with an observation. In other words, it is the box we give you your data in.

The structure of an Observation Context is the same for all instruments and observing modes. As you can see in Figure 7, an Observation Context contains the following products:

History:	Contains the automatically generated script of actions performed on your data, a history of the tasks applied to the data, and the parameters belonging to those tasks.
Auxiliary context:	All Herschel non-science spacecraft data required directly or indirectly in the processing and analysis of the scientific data.
Browse image product	A thumbnail image associated with an observation. This is the thumbnail you see when you browse observations in the Herschel Science Archive, or when you open an observation with the Observation Viewer in HIPE.
Browse product	A representative product from an observation, for example an image or a spectrum. Useful for quick browsing and inspection of observations.
Calibration context:	The parameters that characterise the behaviour of the satellite and the instruments. Used for reprocessing data.
Level-0 context:	Raw data, minimally manipulated.
Level-0.5 context:	Data processed to an intermediate point adequate for inspection.
Level-1 context:	Detector readouts calibrated and converted to physical units, in principle instrument and observatory independent.
Level-2 context:	Scientific analysis can be performed. These data products are in theory at a publishable quality level and should be suitable for Virtual Observatory access. However, please consult the TWiki pages set up by HIFI, PACS and SPIRE for more information on the quality of these products.
Level-2.5 context:	• For PACS, level 2.5 products are photometric maps (`SimpleImage`) produced with MadMap and the high-pass-filter pipeline, combining the scan and cross-scan AORs.

	• For SPIRE, level 2.5 products are destriped maps combinining from the scan and cross-scan AORs from parallel mode.
	• For HIFI, level 2.5 contents depend on the AOT. Broadly there are three kinds of HIFI AOTs: single point observations, spectral scan observations and mapping observations. The first two of these will produce one or more single spectra while the last will produce a spectral cube.
Level-3 context:	• For the PACS photometer, level 3 products are photometric maps (`SimpleImage`) produced by the high-pass-filter pipeline, combining all overlapping images from a given program.
	• For the SPIRE photometer, level 3 products are combined maps of any overlapping areas from the same proposal using scan mode AOTs. The maps are mosaics of the level-2 maps that have been calibrated for extended emission and have the Planck zero-level correction applied.
Observation log context:	A log of actions performed on the Products in the observation context.
Quality context:	Issues flagged by the pipelines that indicate possible issues with the quality of the data or pipelining. An empty quality report indicates no problems in processing.
Trend analysis context	Products useful for tracking systematic changes in instrument response over time.

6. Moving into data analysis and reprocessing

6.1. Starting data analysis

Now that you have had a first look at your data, you will probably want to do so a little more quantitatively by, for example, fitting spectral features in *Data Analysis Guide*, or comparing with data from other observatories by importing non-Herschel FITS files in *Data Analysis Guide*. You may wish to do some basic photometry in *Data Analysis Guide* or other image analysis in *Data Analysis Guide* among other things, for all of which you should look in the *Data Analysis Guide*.

6.2. Reprocessing data

After looking at your data, you may decide that you are not happy with how they were reduced. Because you are supplied with raw data and all calibration and auxiliary products, you can reprocess the data yourself. The information you need to reprocess data can be found in the separate instrument data reduction guides:

• HIFI Data Reduction Guide

• PACS Data Reduction Guide for photometry and spectroscopy

• SPIRE Data Reduction Guide