



# SPIRE Photometer Interactive Analysis (SPIA)

Bernhard Schulz

NHSC/IPAC

on behalf of the SPIRE ICC



# The three data analysis choices

- Pipeline processing
  - Easy and straight forward
  - No flexibility
- Editing and running a script
  - Sophisticated and long learning curve
  - Full flexibility
- Interactive analysis with GUIs
  - Relatively easy to learn
  - Limited flexibility
- Straight pipeline results may often be good enough for science analysis, **but not always**.
- For astronomers with limited resources to learn the system, the GUI IA seems to be the optimal choice

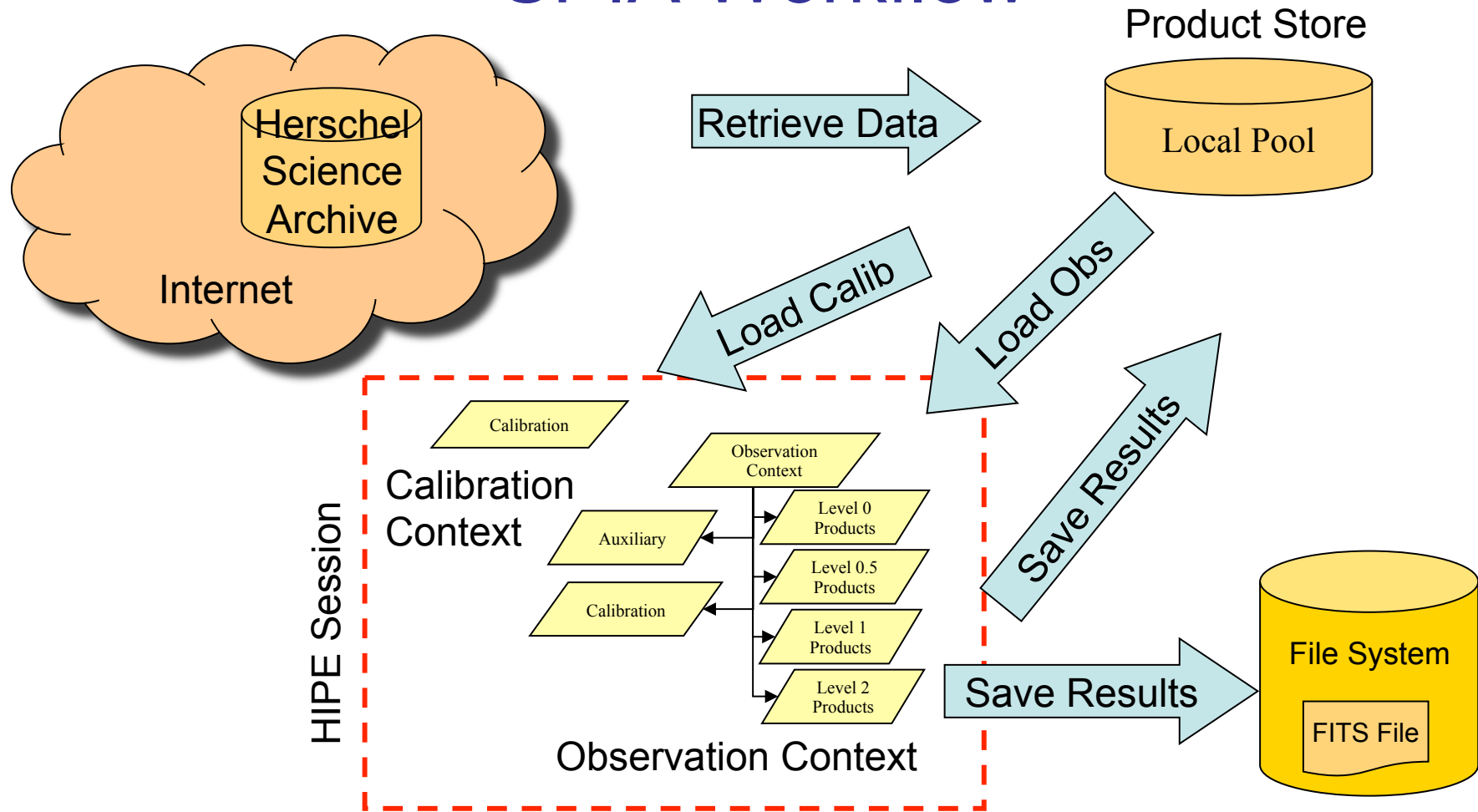


# SPIRE Photometer Interactive Analysis SPIA

- Built around the observation context
- Makes full use of HIPE features
  - Task GUIs, Views, Perspectives, Context Viewer, TablePlotter, Map Display, etc...
- Processing modules are tasks that work on the observation context
- Session oriented
- Supports quick on-the-fly (try-out) data reduction
- Supports easy (few-command) scripting
- Access to module parameters for experts
  - Only change default parameters if you know what you are doing!

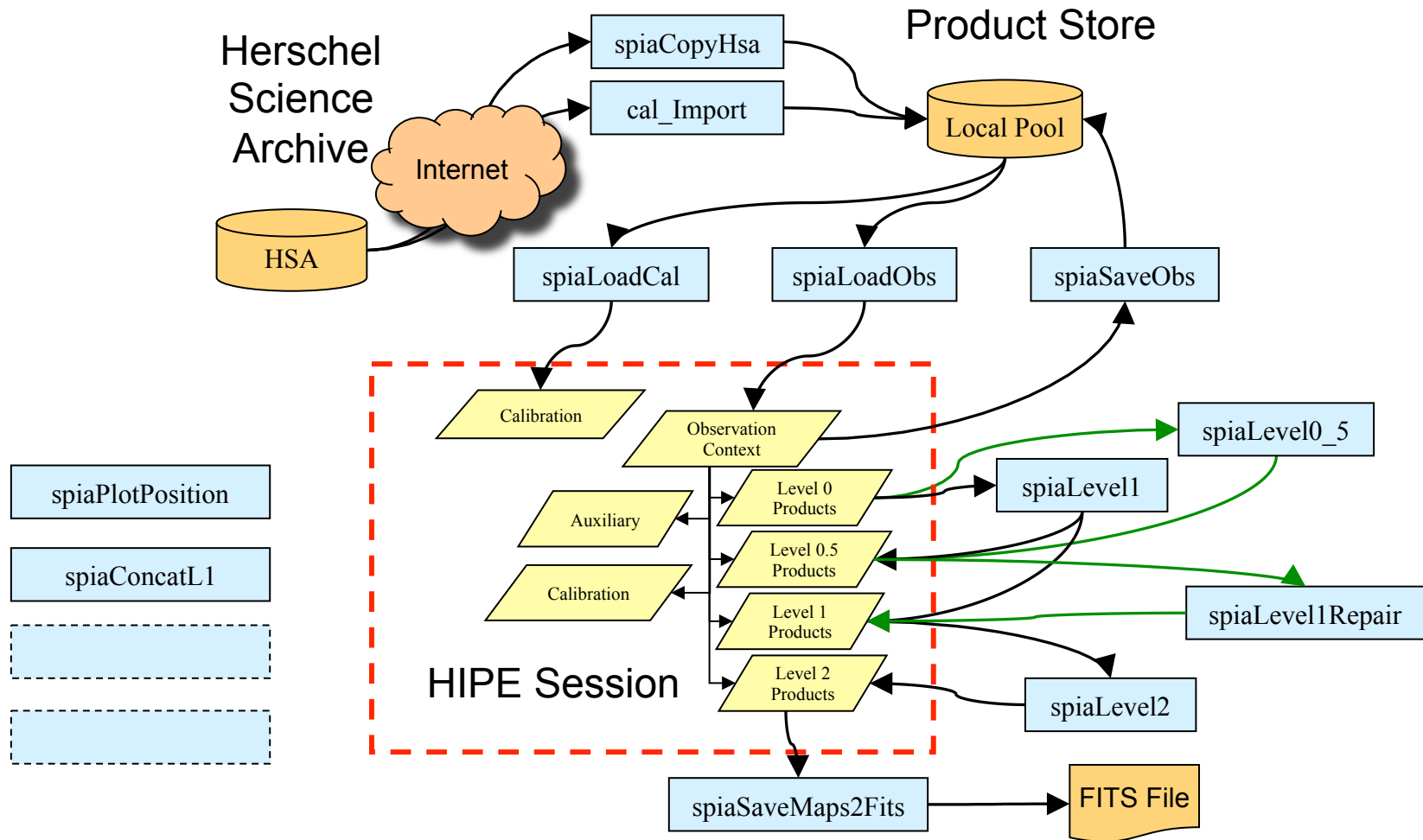


# SPIA Workflow





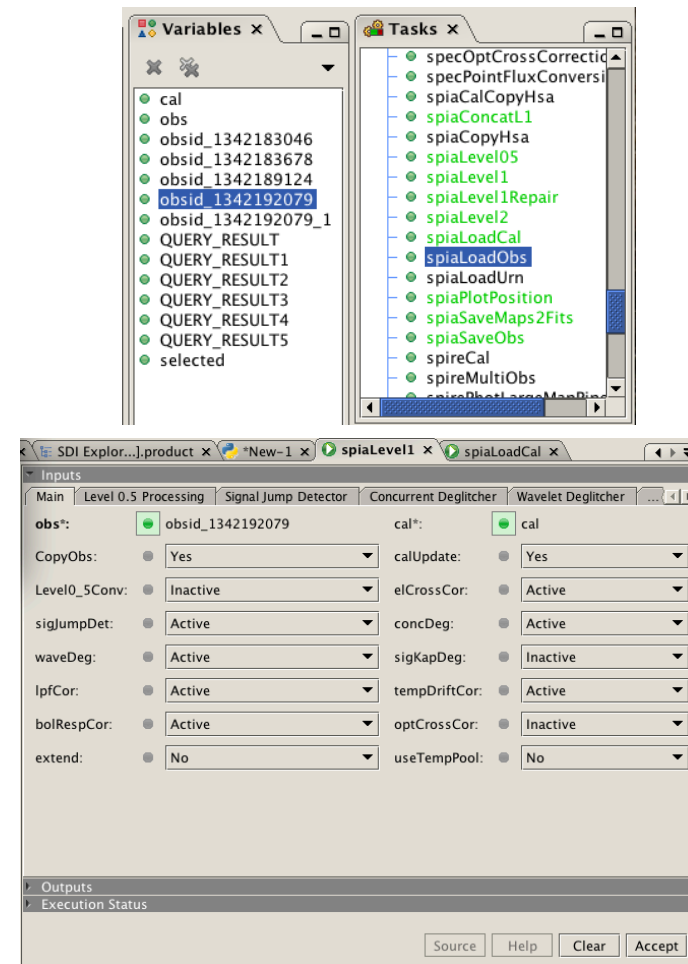
# SPIA Modules





# SPIA Tasks in HIPE

- “Applicable” SPIA tasks will appear when selecting an observation context.
- All SPIA tasks have a prefix “spia”.
- Double-click on the task in the task view activates the task GUI.
- Additional object input parameters like the calibration context are dragged from the variables view to the “input button”.
- The input button turns green when a valid object was attached.





# Screenshot of SPIA Session

The screenshot shows the SPIA software interface with several callouts:

- Variables:** A list of variables including cal, obs, obsid\_1342183046, obsid\_1342183678, obsid\_1342189124, obsid\_1342192079, obsid\_1342192079\_1, obsOut, obsOut1, QUERY\_RESULT, QUERY\_RESULT1, QUERY\_RESULT2, QUERY\_RESULT3, QUERY\_RESULT4, QUERY\_RESULT5, selected, and urn.
- Task List:** A list of tasks including specOptCrossCorrecti, specPointFluxConvers, spiaCalCopyHsa, spiaConcatL1, spiaCopyHsa, spiaLevel05, spiaLevel1, spiaLevel1Repair, spiaLevel2, spiaLoadCal, spiaLoadObs, spiaLoadUrn, spiaPlotPosition, spiaSaveMaps2Fits, and snireCal.
- Task GUI:** A central panel with tabs for Main, Additional Observations, Baseline removal, Destriper, Mapmaking Parameters, and Position Offset. It contains various settings like CopyObs, baselRem, extSrcGains, SsoPmCorrect, makeBrowseImage, updateLevel1, DestriperOn, MapMaker, displayMap, and useTempPool.
- Command Line:** A console window at the bottom showing execution logs: "Copying original observation. Processed 8 scans to level2 maps. Starting with browse product image. Browse product image done. done Level2 OBSID=0x500039cfL".
- Outline:** A tree view on the right showing a hierarchical structure of data and tasks, including obs, History, auxiliary, browseImageProduct, browseProduct, calibration, level0, level0\_5, level1, level2, logObsContext, and quality.



spiaPlotPosition  
Output  
detector scan track  
is plotted in green

# Another Screenshot

Variables View

The screenshot displays the HIPE software interface. The main window shows a 'Scan Overplot' with 'pixel number' on the x-axis (0.0 to 140.0) and 'pix' on the y-axis (10.0 to 170.0). The plot shows a star-shaped detector scan track with green lines. The RA axis ranges from 17:57:00 to 17:56:00, and the DEC axis ranges from +51:35:00 to +51:25:00. The 'spiaPlotPosition' window has several parameters: obs: obsOut1, array: PSW, det1: PSWE8, plotScanNumber: Yes, nScansPerMap: 1, and FontSize: 8. The 'Variables' window lists variables like cal, obs, obsid\_1342183046, etc. The 'Tasks' window shows a list of tasks including spiaCalCopyHsa, spiaConcatL1, spiaCopyHsa, spiaLevel05, spiaLevel1, spiaLevel1Repair, spiaLevel2, spiaLoadCal, spiaLoadObs, spiaLoadUrn, spiaSaveMaps2Fits, spiaSaveObs, spireCal, spireMultiObs, and spirePhotLargeMapPip. The 'Task Outline' window shows a table with columns Pa..., ..., Par... and rows for obs\*, array, det1, plotSc, nScan, and FontSi.

Pa...	...	Par...
obs*	IN	Obs...
array	IN	'P... String
det1	IN	'P... String
plotSc	IN	'Y... Object
nScan	IN	1 Inte...
FontSi	IN	8 Inte...

Task View

Task GUI

Task Outline View





# SPIA Scripting

```
1 # Easy SPIA Data Reduction script for point sources
2 # Load data from HSA, process, and save to local pool
3
4 obs = spiaLoadObs(ObsID=1342192079L, Pool='hsa')
5 cal = spiaLoadCal()
6 obsOut = spiaLevel1(obs=obsid_1342192079, cal=cal)
7 obsOut = spiaLevel2(obs=obsOut, cal=cal, extSrcGains=False)
8 urn = spiaSaveObs(obs=obsOut, nameTag='Gamma Dra test reduction', Pool='test')
9
```

- Example of a full re-reduction of a SPIRE scan map of a point source. The map is loaded from the HSA and the result is saved in a local pool.
  - make sure the “HSA” square is selected in the Product Browser for the first command to gain access to the archive (this is a bug).
- All parameters are either mandatory or at their default setting
  - Except for extSrcGains (apply extended source gains) which is True by default. Gamma Dra is a point source!
- SPIA scripting is simple and eliminates many errors due to typos when handling long and complex scripts.



# Availability

- Distribution from NHSC Wiki
  - HIPE Plugin
    - Current version is 1.9
    - Persistent after installation
  - User's Manual in SPIRE Data Reduction Guide, Chapter 11
  - Publication ADASS 2010 proceedings
    - <http://arxiv.org/abs/1101.1284>
- <https://nhscsci.ipac.caltech.edu/sc/index.php/Spire/SPIA>