



# SPIRE

## Hands-On Exercises

Bernhard Schulz (NHSC/IPAC)

on behalf of the  
SPIRE ICC, the HSC and the NHSC





# Preliminaries: Don't Forget

- If you haven't done so, install the Planck HFI maps for zero-point correction.
  - Download the Planck HFI maps needed for zero-point correction. They can be found at:
    - [https://nhscsci.ipac.caltech.edu/spire/data/zeroPointCorrection/DX9\\_map\\_545\\_smooth\\_8arcmin.fits](https://nhscsci.ipac.caltech.edu/spire/data/zeroPointCorrection/DX9_map_545_smooth_8arcmin.fits)
    - [https://nhscsci.ipac.caltech.edu/spire/data/zeroPointCorrection/DX9\\_map\\_857\\_smooth\\_8arcmin.fits](https://nhscsci.ipac.caltech.edu/spire/data/zeroPointCorrection/DX9_map_857_smooth_8arcmin.fits)
  - Include the following two lines into file `~/hcss/user.props`
    - `spire.spg.hfi.545map="<path>/DX9_map_545_smooth_8arcmin.fits"`
    - `spire.spg.hfi.857map="<path>/DX9_map_857_smooth_8arcmin.fits"`
  - `<path>` must be replaced by the location of the HFI files.
- If you haven't done so, apply the SPIA fix to HIPE 12.1
  - Download the following file:
    - [https://nhscsci.ipac.caltech.edu/spire/DPsoftware/Hipe12.1\\_patch/spire\\_ia\\_tools\\_13.23.17.jar](https://nhscsci.ipac.caltech.edu/spire/DPsoftware/Hipe12.1_patch/spire_ia_tools_13.23.17.jar)
  - Follow the instructions in:
    - [https://nhscsci.ipac.caltech.edu/spire/DPsoftware/Hipe12.1\\_patch/README.txt](https://nhscsci.ipac.caltech.edu/spire/DPsoftware/Hipe12.1_patch/README.txt)
- Restart HIPE for the new environment to take effect.
- If you haven't installed the SPIRE calibration tree yet, download the calibration tree.
  - Download the following file:
    - [https://nhscsci.ipac.caltech.edu/workshop/Workshop\\_Oct2014/Photometry/SPIRE/spire\\_cal\\_12\\_3.jar](https://nhscsci.ipac.caltech.edu/workshop/Workshop_Oct2014/Photometry/SPIRE/spire_cal_12_3.jar)
  - Execute in HIPE:
    - `cal = spireCal(saveTree=True, jarFile='<path>/spire_cal_12_3.jar')`
  - where `<path>` is the path where you downloaded the jar-file.
- Download and register example data
  - Download the following file
    - [https://nhscsci.ipac.caltech.edu/workshop/Workshop\\_Oct2014/Photometry/SPIRE/cxu202615313.tar](https://nhscsci.ipac.caltech.edu/workshop/Workshop_Oct2014/Photometry/SPIRE/cxu202615313.tar)
  - Untar the file
  - Use the HIPE Navigator and double-click on the file with the Saturn icon.



# Exercise 1

## Run photometry script on point source observation

- Clear out all variables from previous exercise
  - On top of variables view click double cross and confirm deleting all variables.
- Select photometry script
  - Select “Scripts->SPIRE Useful scripts->Photometer Point Source Photometry”.
- Edit script and run
  - Change line 74 to “obsid = 1342183475”.
  - Change line 86 to “ obs = getObservation(obsid, poolName="hsa", instrument="SPIRE") ”
  - Hit “Accept” and wait for completion.
- Inspect Console Output
  - The script takes automatically the source at the center of the map.
  - The script uses Sussextractor to determine the actual position of the source and also determine photometry.
  - Timeline fitter uses this position to fit the Level 1 timelines to a two dimensional Gaussian. This method generates the most accurate results.
  - Daophot is run twice, once with automatic aperture correction and once with tabulated correction factors.
  - The last method used is standard aperture photometry
- Now try the same with a slightly improved photometry script:
  - [https://nhscsci.ipac.caltech.edu/workshop/Workshop\\_Oct2014/Photometry/SPIRE/Photometer\\_Photometry\\_tweaked.py](https://nhscsci.ipac.caltech.edu/workshop/Workshop_Oct2014/Photometry/SPIRE/Photometer_Photometry_tweaked.py)
  - The changes in there are still experimental and are detailed in the header.



## Exercise 2

### Create maps with different pixel sizes

- Clear out all variables from previous exercise
  - On top of variables view click double cross and confirm deleting all variables.
- Load observation from pool
  - Open Product Browser, select pool MyHSA, enter 1342183475 into field “Observation ID” and hit “Run”.
  - Double-click observation with version number 12 to load.
- Re-run processing from Level 1 to Level 2
  - Click on observation context in variables view and note applicable tasks appearing in the tasks view. Open “Applicable” folder if necessary with double-click.
  - Double-click “spiaLoadCal” and click “Accept” in the appearing GUI which loads the calibration tree “cal”.
  - Click on observation context again and double-click “spiaLevel2” in the tasks view.
  - Drag and drop variable “cal” into the parameter with the same name in the appearing GUI.
  - Switch “DestriperOn” to “Inactive” and “Mapmaker” to “Naïve”.
  - Select Tab “Mapmaking Parameters” and enter desired pixel sizes into parameters “pixelSizePXW” where “X” is one of [S,M,L]. For instance select 12” for all maps.
  - Hit “Accept” and wait for completion.
- Inspect Data in observation context
  - Inspect the newly created maps in the new observation context “obsOut”.
  - Note that we didn't have to execute the destriper because the Level 1 data from the archive is already destriped.



## Exercise 3

### Reprocess an entire observation with turnaround data

- Clear out all variables from previous exercise
  - On top of variables view click double cross and confirm deleting all variables.
- Select pipeline script
  - Select “Pipeline->SPIRE->Photmeter Large Map User Pipeline”.
- Edit script
  - Change line 57 to “myObsid = 1342183475”.
  - Change line 58 to “myDataPool = ”hsa”.
  - Change line 59 to “outdir = ”mypath” where mypath is a path to one of your directories.
  - Change line 73 to “includeTurnaround = True”.
- Start processing
  - Click double green arrow to execute full script.
  - This will take a little longer.
    - (“Patience young Padawan” Master Yoda)
- Inspect Results
  - Upon completion the resulting maps will be saved in the directory you specified and also be available in the level 2 context of the observation context “obs”.
  - Note that the script does not update the extended source maps, so these will still exist untouched.
  - Note that if you want to process also extended source maps, use either the SPIA script from Exercise 2 or the SPG Large Scan Map.



## Exercise 4

### Saving a reprocessed observation

- Do NOT clear out variables from previous exercise
- Invoke Save Products Tool
  - Right click on observation context “obs” that was previously generated in the variables view.
  - Select “Send To -> Local Pool”.
- Fill in parameters and save
  - Select observation context “obs” again in appearing list of variables.
  - On the right fill in the “Tags” column with something recognizable, for instance “1342183475 reprocessed point source maps with turnaround data”.
  - At the bottom use “Select Pool” to either specify an existing pool or create a new pool name.
  - Hit “Save” to complete.
  - This may take a while depending on the size of the observation.