Running the Pipeline

Activate the Virtual Environment

Once you have access to the pipeline, either accessing the SOAR VNC Server [1] or Downloading and Installing it locally [2], open a terminal. The standard and recommended installation of the Goodman Data-Reduction Pipeline uses Python Virtual Environments. That means that every time that you open a new terminal, you have to activate the environment where the pipeline is installed. You can do that using the following command:

```
$ source activate <virtual_environment_name>
```

You can check if the environment was activated normally by the command below:

```
conda info --envs
```

A list of Virtual Environments will be displayed and the active virtual environment will be marked with an asterisk (*).

Setup your data

Once you have the Virtual Environment activated, create a folder to copy your data inside. It is a good practice to work on a copy of the data and leave the original untouched. Hence, the Goodman DRP will **always** generate new files from the raw data.

The pipeline does not have a data quality control yet. So, please, always check your data before running it. Verify if your spectra actually have some signal or if some cloud passed by in the middle of the exposures. If you have dome and quartz flats, keep just one of them. Make sure that your data is supported by the pipeline [3].

Process CCD

The Goodman DRP is split into two steps: CCD processing (`redccd`) and Spectrum processing (`redspec`). The first one will perform the following operations:

- Group different configurations using the Region Of Interest (ROI), mode (Imaging/Spectroscopic), slit, grating, wavelength mode (for spectroscopic mode), and pointing.
- Trim and combine BIAS data.
- Trim, correct BIAS, combine and normalize FLAT data.
- Trim, correct BIAS, correct FLAT and remove cosmic rays on OBJECT data.

To execute it, open a terminal and, if you are using virtual environments, [activate it](). Then, simply run:

```
(name_of_my_virtual_environment) [/path/to/my/data] $ redccd
```

This will create a new folder "`./RED`" where you are. `redccd` stores the processed data there. The processed images will have prefixes like "`cfzsto_`". Please, refer to the Goodman DRP User Manual for more information on the meaning of each prefix. If you want to check more options, you can also check the manual or simply type:

```
(name_of_my_virtual_environment) [/path/to/my/data] $ redccd --help
```

Process Spectrum

The second step consists of spectroscopical operations like:

- Identifies multiple point-source targets (spectra of more than one object in the slit);
- Find the wavelength solution (See [Available Modes]() [3]);
- Linearize data (resample);
- Write wavelength solution to FITS header;
- Create a new file for the wavelength calibrated 1D spectrum;

At this point, you might want to review the output data from `redccd` and check if they have relevant information. Once this is done, go to the "`./RED`" folder and run the `redspec`:

```
(name_of_my_virtual_environment) [/path/to/my/data] $ cd RED
(name_of_my_virtual_environment) [/path/to/my/data/RED] $ redspec
```

That should process your data. Please, check the log messages since they describe the origin of possible existing errors. Once it finishes, you have your data ready for science applications. In some cases, you might want to combine the data generated. For that, you will have to use an external tool.