How to Setup and Install Prospector on Linux

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1.) Enable Sudo Permissions

First make sure that your account has sudo privileges. If you are the sole user of the computer, that should be true by default. But on shared computers it oftentimes is not. You can check with:

```
sudo whoami
```

If you get the output “root”, then you are good to go. If you get an error saying that your account is not in the sudoers file, follow these instructions.

2.) Python Version

Ensure that you have an up to date version of Python. Prospector requires Python3.9 or later. You can check with the command:

```
python3 -V
```

If you do not have an up to date python package, you can update it with the following commands:

```
sudo apt update && sudo apt upgrade -y

sudo add-apt-repository ppa:deadsnakes/ppa
sudo apt update

sudo apt install python3.12
```

Note that 3.12 is the latest stable release as of the making of this document.

3.) Prospector Dependencies

The homepage and documentation for Prospector is located at the shared link. There is an installation page, but here I write out the steps in more detail.

3a.) Python Libraries

Prospector needs a number of python libraries installed. Run the following code to install them. If they are already installed you will get messages saying “Requirement already satisfied:....”.

```
pip3 install numpy scipy astropy emcee dynesty h5py pytest fsps
astro-sedpy
```

3b.) Fortran Complier

We need to install a Fortran compiler because some dependencies use old Fortran code.

```
sudo apt install gfortran
```

3c.) MPI & HDF5

MPI stands for Message Passing Interface and is needed for the parallel processing Prospector runs. We are going to install openMPI, which has documentation here and downloads here. On the downloads page download the latest stable release (which is 5.0.3 at time of writing). You should click the link with the “.tar.gz” file ending. Once downloaded, move the file to a place in your home directory that you will remember.

```
mv Downloads/openmpi-5.0.3.tar.gz Documents
```

This next step also requires this library

```
sudo apt install libnuma-dev
```

Then run the following lines of code in the directory where the file lives:

```
gzip -dc openmpi-5.0.3.tar.gz | tar -x
cd openmpi-5.0.3
./configure 2>&1 | tee config.out
make all 2>&1 | tee make.out
sudo make install 2>&1 | tee install.out
```

The configure, make, and make install commands will take a couple minutes to run and output a lot of lines.

Finally, install HDF5, which is something that h5py needs to run.

```
sudo pip3 install versioned-hdf5
```

3d.) FSPS

FSPS stands for Fast Stellar Population Synthesis, and is what allows Prospector to simulate stellar spectra. The python module fsps installed above will be referred to as python-FSPS. FSPS is a (fortran) library that python-FSPS uses. The first thing you are going to want to do is specify the path where this will live. The easiest way to do this is to add the following line to the end of your ~/.bashrc file.

```
export SPS_HOME="/path/where/you/want/to/download/fsps"
```

Run “source ~/.bashrc” to reload the file and make sure it wont load any errors.

Then install git with

```
sudo apt install git
```

So we can run the command

```
git clone https://github.com/cconroy20/fsps.git $SPS_HOME
```

Depending on your internet speed this could take a minute.

4.) Install & Test Prospector

We want to test a jupyter notebook , but we need to open it in a conda environment for things to work correctly. (Or at least setting it up outside one is a pain). First install miniconda with the following:

```
mkdir -p ~/miniconda3

wget https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86_64.sh
-O ~/miniconda3/miniconda.sh
```

```
bash ~/miniconda3/miniconda.sh -b -u -p ~/miniconda3

rm -rf ~/miniconda3/miniconda.sh

~/miniconda3/bin/conda init bash
```

Then restart your terminal. Now we will create an environment in with prospector will be run.

```
git clone https://github.com/bd-j/prospector
cd prospector
conda env create -f environment.yml -n prospector-env
conda activate prospector-env
# Install latest development version of prospector
pip3 install astro-prospector
```

Then, finally, you can test to see if everything is working with this jupyter notebook. Hopefully nothing should break through the whole notebook. Although running the notebook will take a while. So don't if cells take a long time to finish.

Jupyter can be installed with

```
sudo pip3 install jupyter
```

And make sure to do this step within the prospector-env environment.

Then run:

```
ipython kernel install --name "my-venv" --user
```

To make sure that the kernel of the prospector-env environment is available in the jupyter notebook kernel selection. This is so that when you update or add packages from the terminal with pip, jupyter notebook knows where to find them automatically.