jupyter

Context

```
import space_phot
…
synphot_file = './
synphot5.tar.gz'
…
```

Task query

Generate code

Execute

Evaluate results

Processing tasks

Query

Once our environment is set up, the next step is to extract and process data necessary for photometric analysis. […] you should derive the exact coordinates to focus on by utilizing sky coordinate tools […]

Ground truth code

```
…
ref_y, ref_x = skycoord_to_pixel(source_location,
    wcs.WCS(ref_fits['SCI', 1], ref_fits))
ref_cutout = extract_array(ref_data, (11, 11),
    (ref_x, ref_y))
…
```

Extracted key variable values

Ground truth

```
ref_y: …
ref_x: …
ref_cutout: …
```

Generated code

```
ref_y: …
ref_x: …
ref_cutout: …
```
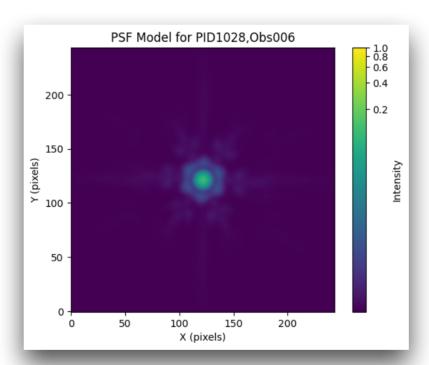
Evaluation: compare values

Visualization tasks

For the final part of this assignment, let's visualize the PSF model derived earlier. We aim to create a clear representation of the data highlighting any potential faint sources by careful manipulation of image scaling. The objective is to produce a visually distinct image through which we're able to discern and identify the physical characteristics defined within the PSF model. […]
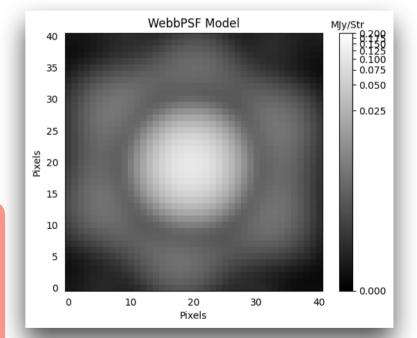
Generated code

```
…
psf_data = psfs[0].data
norm = simple_norm(psf_data,
stretch='log', min_cut=1e-6, max_cut=1)
plt.imshow(psf_data, origin='lower',
norm=norm, cmap='viridis')
…
```

Ground truth code

```
…
ref_cutout = extract_array(psfs[0].data,
(41, 41), (122, 122))
norm1 = simple_norm(ref_cutout,
stretch='log', min_cut=0.0, max_cut=0.2)
plt.imshow(ref_cutout, origin='lower',
norm=norm1, cmap='gray')
…
```


Evaluation: VLM do these images convey the same content?

No error   **Minor error**   **Major error**

The under-test visualization, while showing the same basic PSF structure, fails to effectively highlight faint sources and background noise due to suboptimal scaling choices. The colormap choice and intensity scaling make it harder to discern subtle features that are visible in the ground truth. These are fixable issues but impact the visualization's ability to fulfill the stated goals.