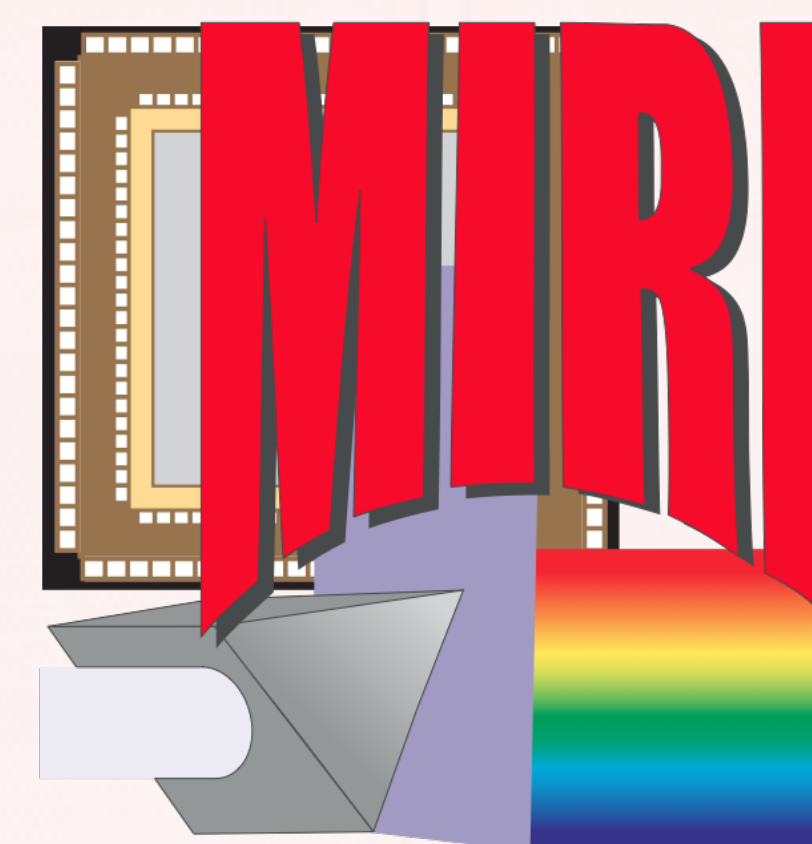


# MIRISim

## the JWST-MIRI Simulator

### MIRI European Consortium



## What is MIRISim?

MIRISim is a publicly available, full instrument simulator designed to reproduce the expected performance of the Mid-Infrared Instrument (MIRI) on the James Webb Space Telescope. It produces FITS files consistent with JWST data, that can be reduced by the JWST Pipeline (developed by STScI).

The MIRI team developed MIRISim to support the ground test program and are using it to guide preparations for commissioning. MIRISim is provided as a tool to familiarize astronomers with data produced by MIRI, how to reduce these, and to help with observation feasibility studies.

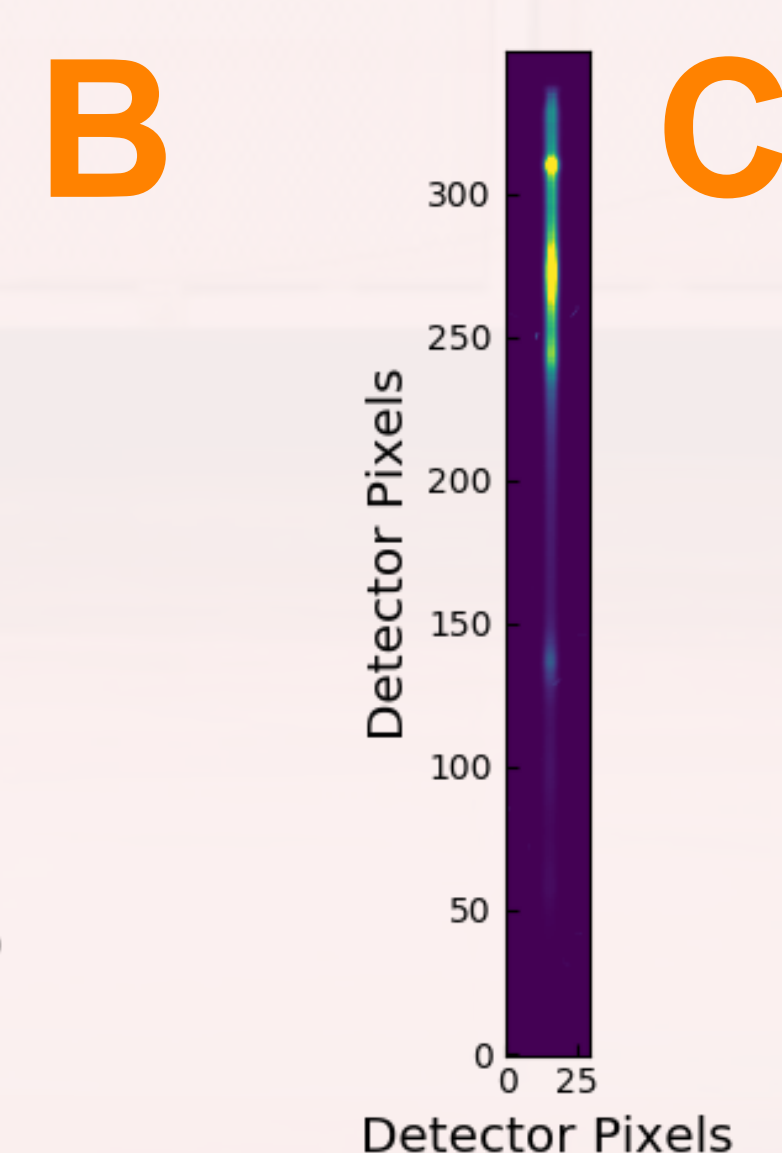
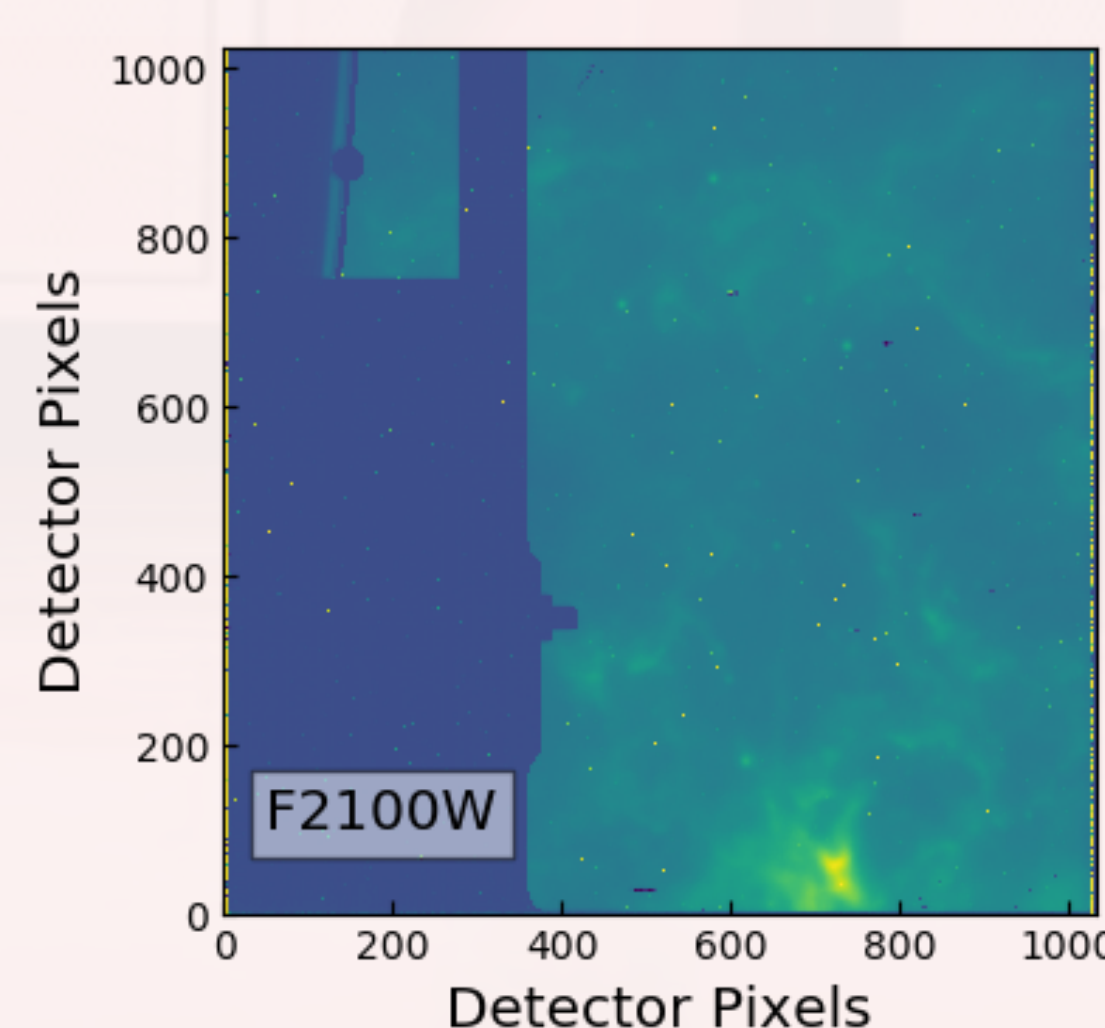
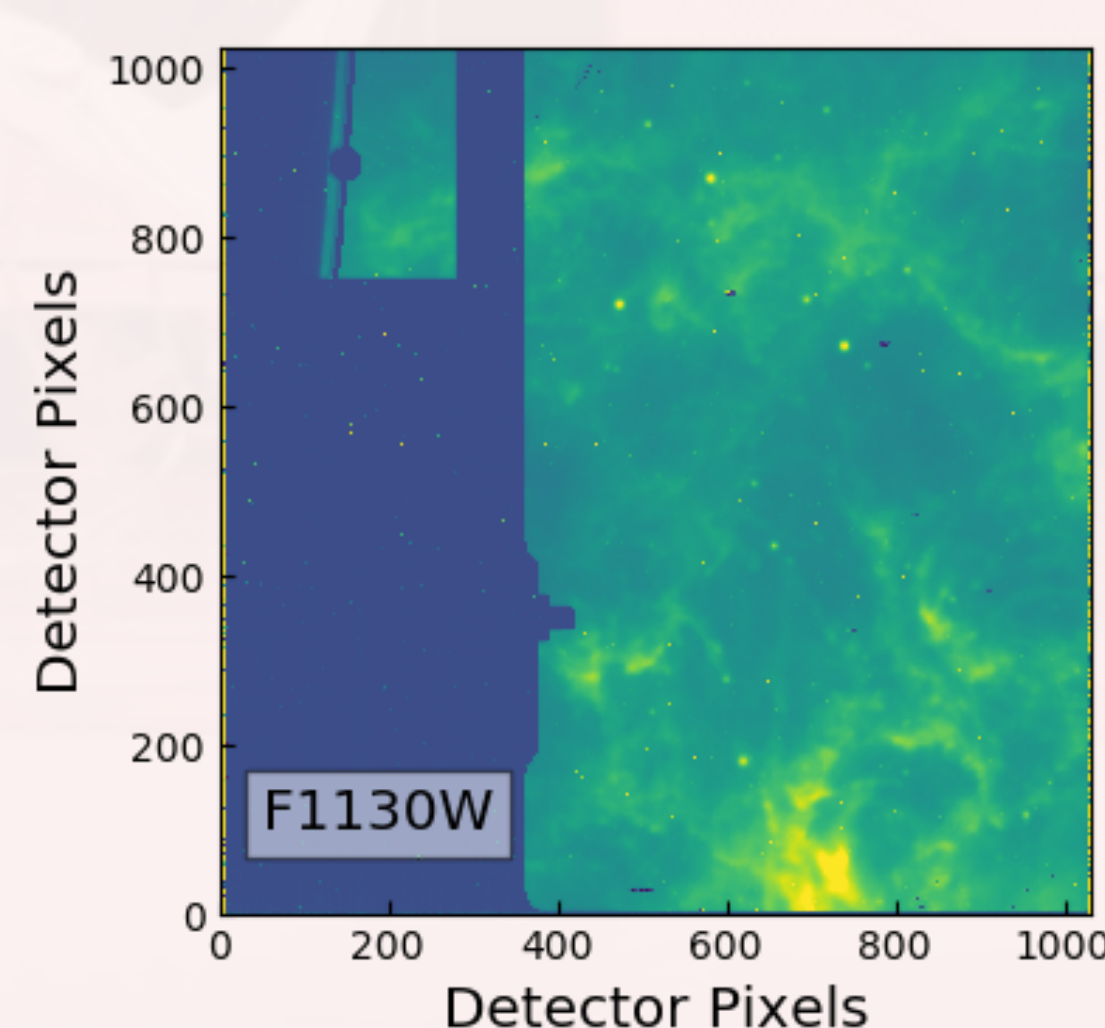
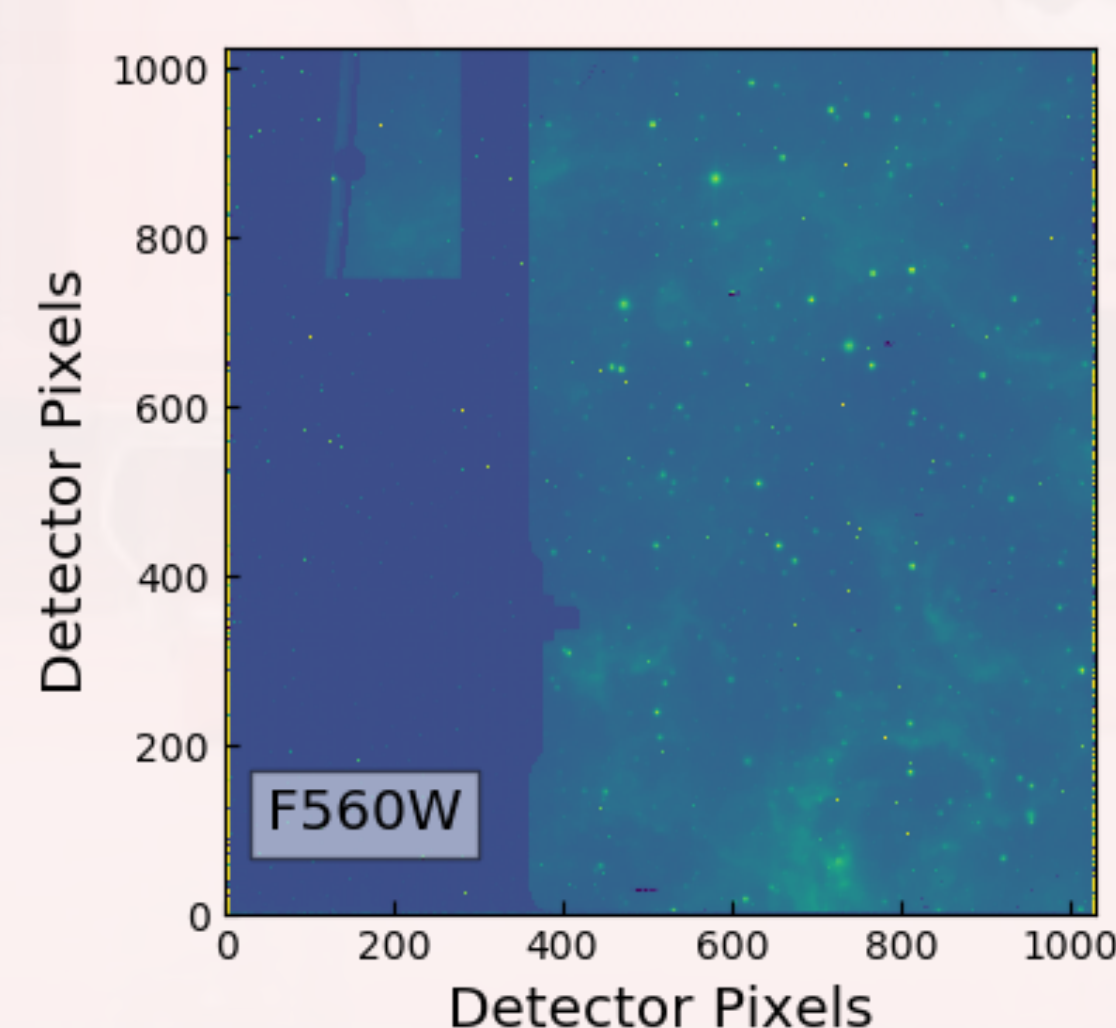
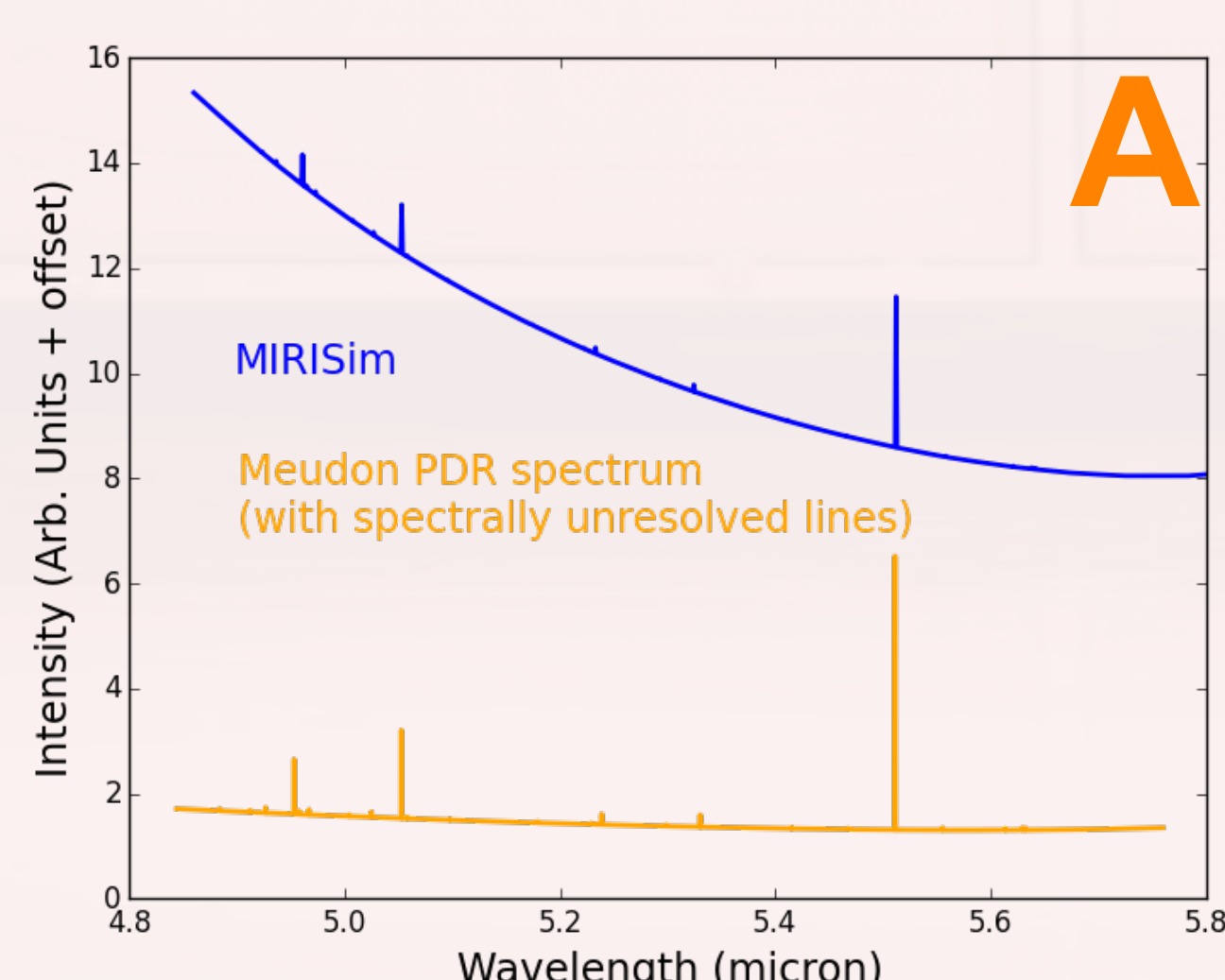
## Where to get it?

MIRISim is released as part of the MIRISim-MIRICLE data analysis package, which is a Python-3 based Anaconda environment, available for Linux / Mac.

Download script and instructions available at:  
[www.miricle.org/](http://www.miricle.org/) (follow the "MIRISim Install" link)

MIRISim uses the MIRI calibration files, downloaded automatically during simulation, to simulate the major instrument effects (e.g. linearity, saturation, distortion, flatfield, fringing, etc).

## Simulation: Carina at distance of LMC as seen with MIRI Imager, LRS, and MRS



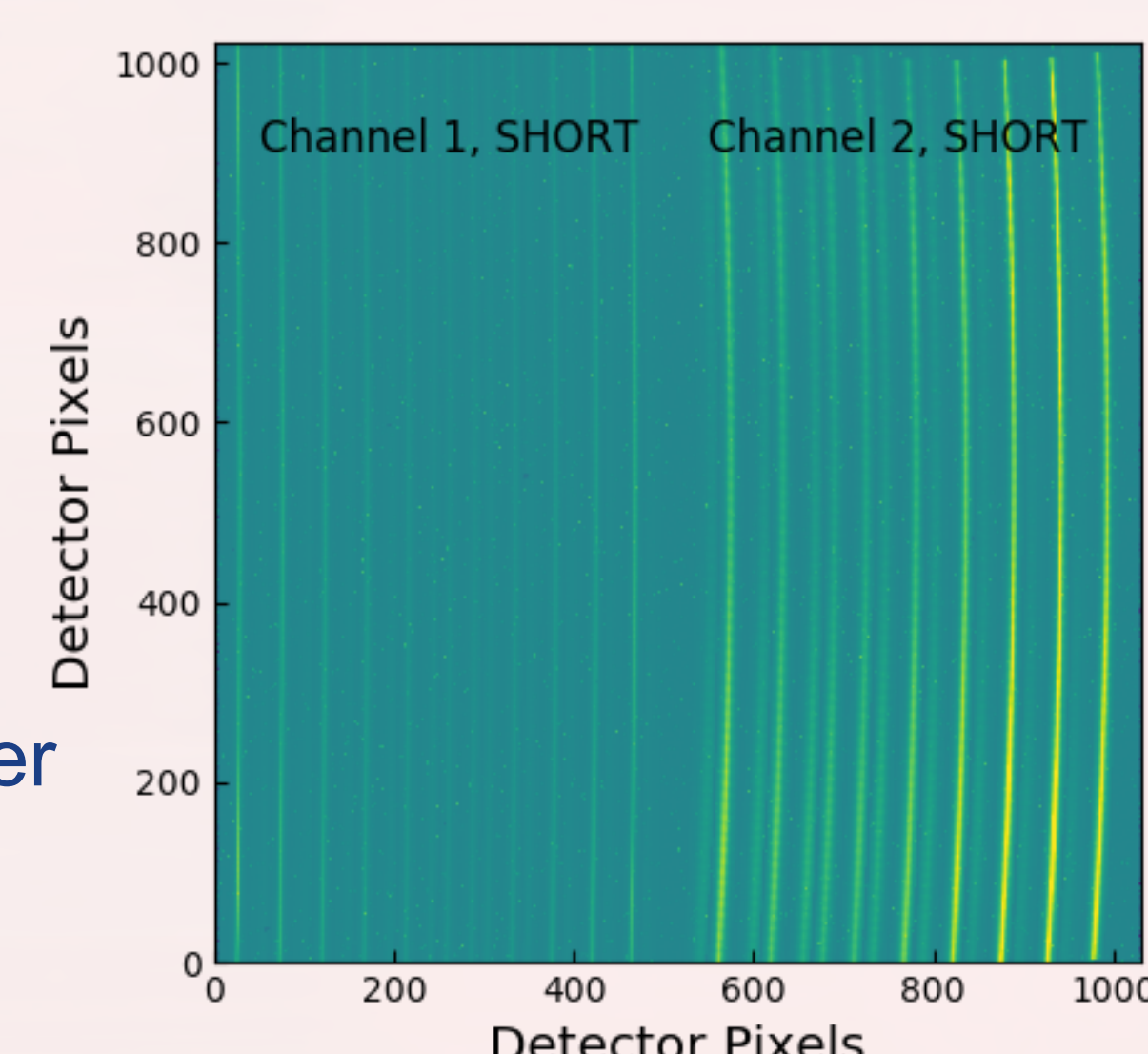
Simulations of how MIRI might observe an active star-forming region like Carina ( $d=2.3$  kpc) at the distance of the LMC (50 kpc):

- \* Created input FITS cubes produced by resampling 3.4, 4.6, 12, 22 micron WISE survey images (Wright et al. 2010) to 1.3 arcsec resolution, equivalent to 0.06 arcsec @  $d=50$  kpc.

- \* Created input PDR spectrum (Fig. A) from Meudon PDR code (Le Petit et al. 2006) added to extended disk (for MRS) or point source (for LRS).

Figures show simulated data of single exposure of 100 frames in FAST mode for:

- B: Imager in 3 filters
- C: Low Resolution Spectrometer slit spectrum detector image
- D: Medium Resolution Spectrometer IFU detector image



## How to get started

1. Following installation, start up the "mirisim" conda environment  
`source activate mirisim`
2. Generate default simulation input config files:  
`mirisim --generate-configfiles`
3. Edit simulation / scene files as desired:  
E.g. change dither pattern, nr. of exposures, filters, etc.
4. Run the imager simulation  
`mirisim ima_simulation.ini`
5. Explore output directory for simulated data, log, copy of input files used

```
[Integration_and_patterns]

[[Dither_Patterns]]
Dither = True
StartInd = 1
NDither = 2
DitherPat = ima_recommended_dither.dat

[[IMA_configuration]]
filter = F1130W
ReadDetect = FULL
Mode = FAST
Exposures = 5
Integrations = 4
Frames = 10
```

Excerpt from Imager  
simulation config file.

## To learn more...

Visit [miricle.org](http://miricle.org) and follow "MIRISim Install" for:

- \* Installation instructions, FAQs
- \* User Guide + Jupyter notebooks with walkthroughs
- \* Latest release notes (v2.0.0, August 2018)
- \* Mailing list for release announcements

and/or

Come talk to me at ADASS:  
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