



Introducing CorrSim

A Correlated Timing Observation Simulator

or

“How to predict observations
before they happen”

Two big problems that face every observational astronomer...

- How can I be sure my observation will give me good data?

Is it bright enough? Am I observing long enough? Is my telescope good? Etc...

- How do I know my data are representative of my source?

Is that feature real? Is it just noise?

Introducing: CorrSim

By taking a Fourier model of your source and various telescope properties, CorrSim **simulates a multiwavelength observation**, giving you lightcurves, correlation functions, power spectra, and more!

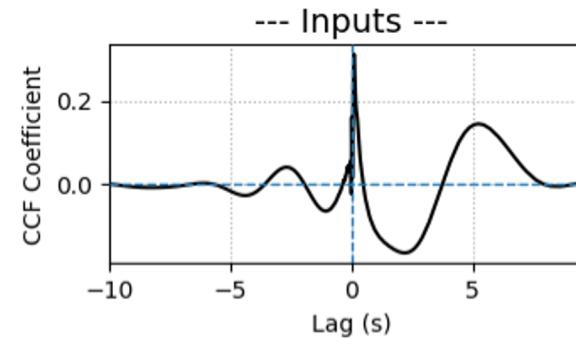


Powered by Stingray (Huppenkothen+19)

How does it work?

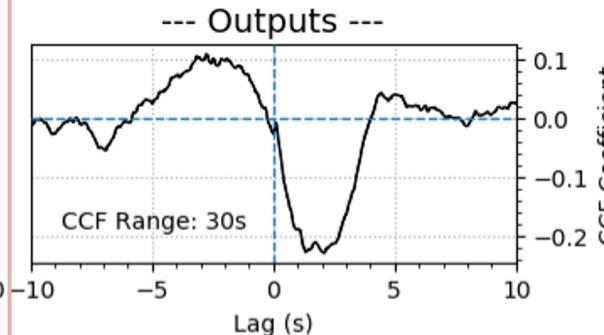
Correlation Function ->

Input a model of your source...



Power Spectrum ->

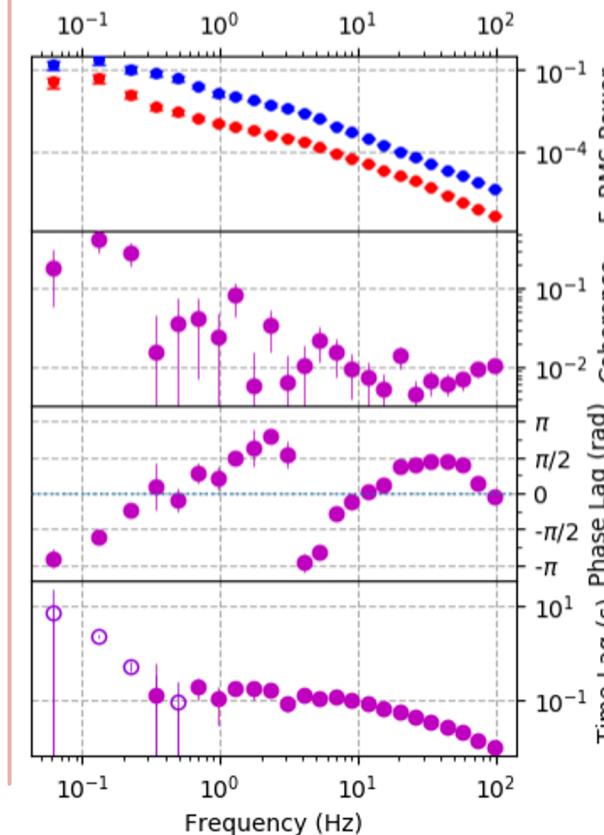
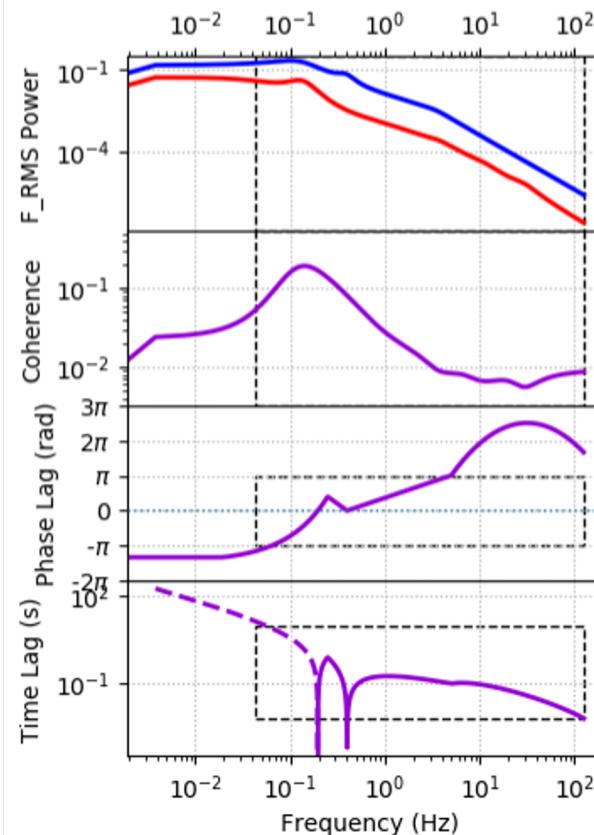
...and get an example observation!



Coherence ->

Phase Lags ->

Time Lags ->



Based on data from
Paice et al. 2019

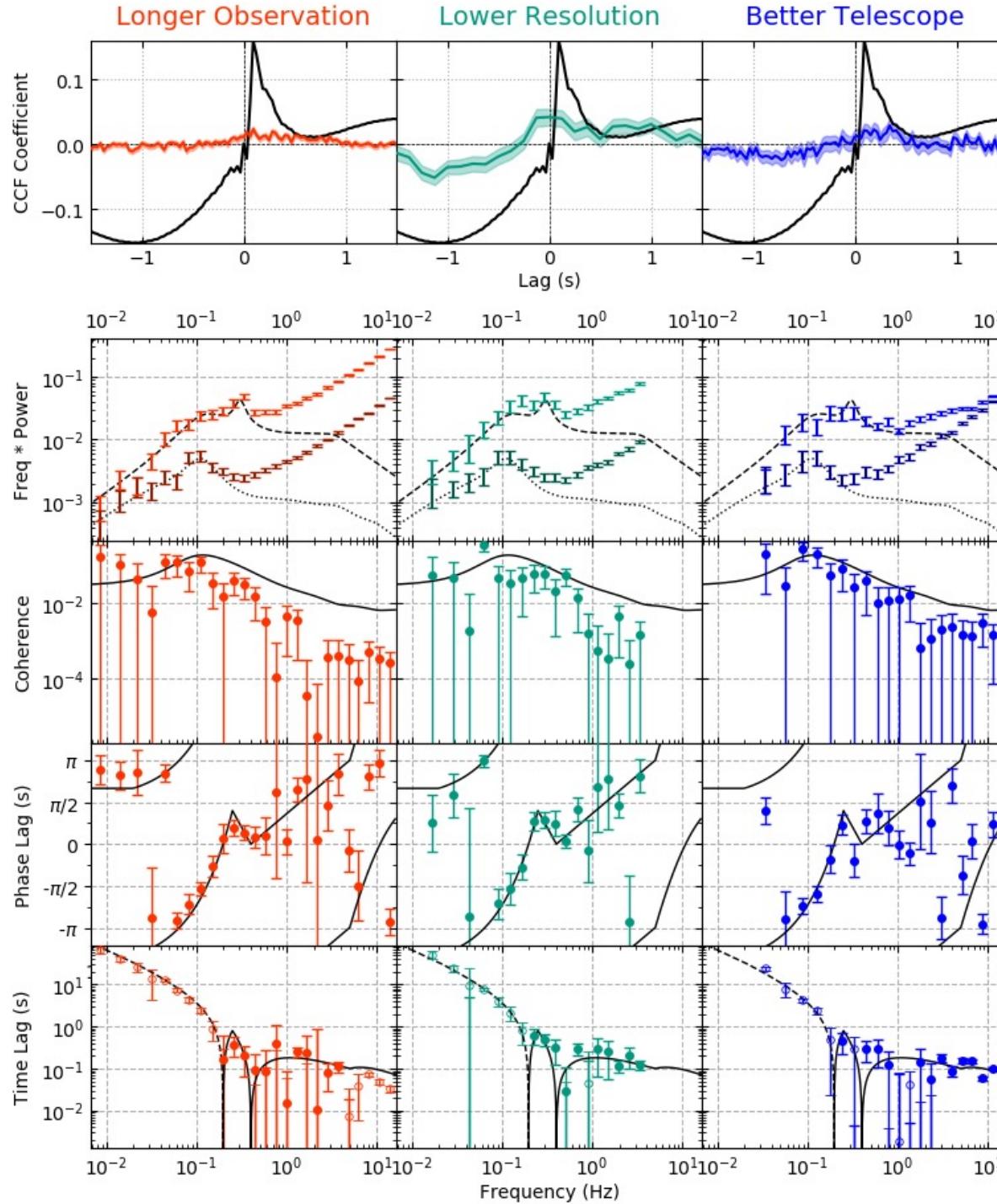
Instruments:
HiPERCAM (optical)
NICER (X-ray)

Key:
Black = Input
Colours = Outputs

Compare your setups!



*See more
examples here!*



<- Correlation Function

<- Power Spectrum

<- Coherence

<- Phase Lags

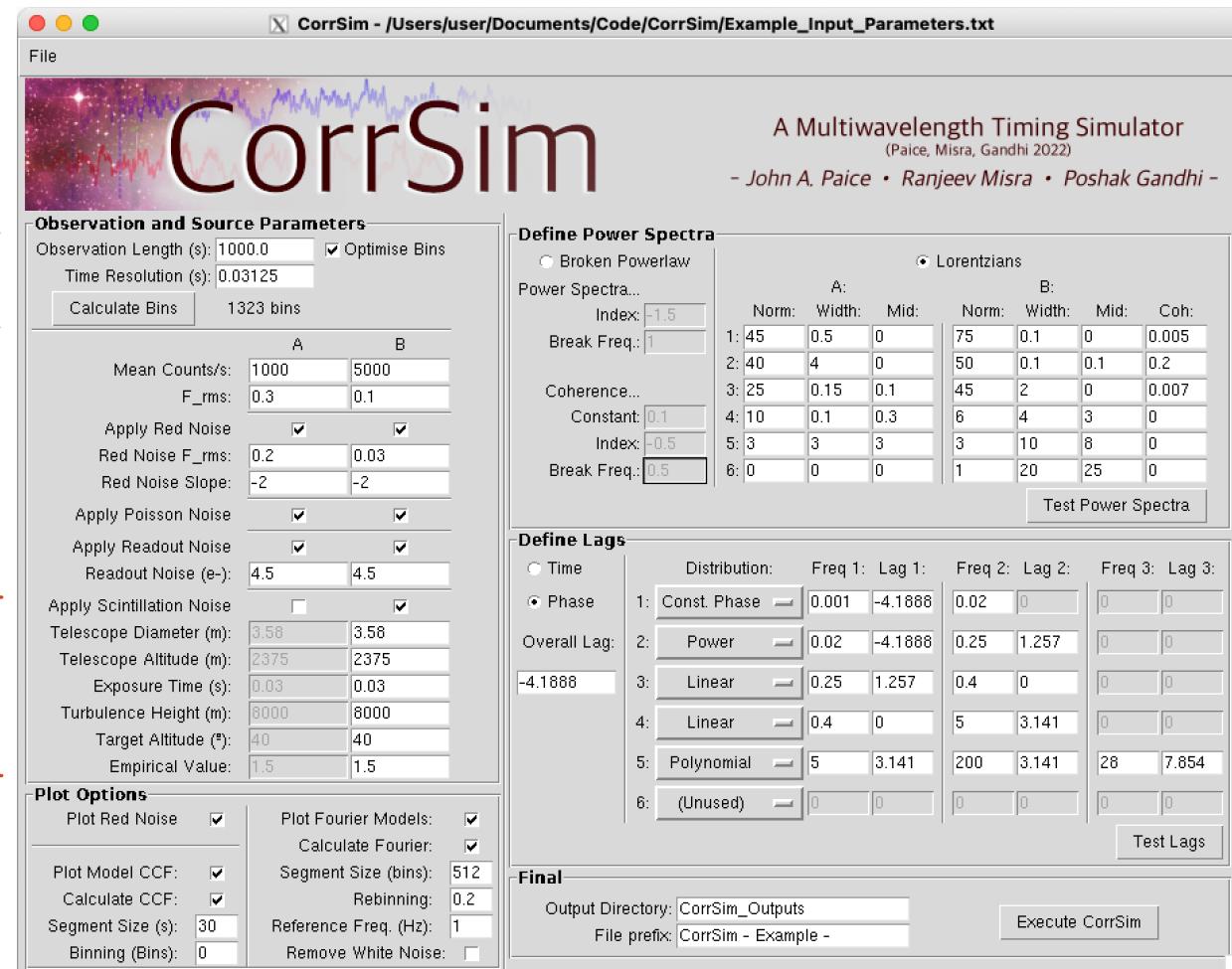
<- Time Lags

Available as a GUI

Enter your desired Observation Length and time resolution

Define your source through Count Rate, Fractional RMS, and various noise sources.

Scintillation can be simulated using telescope parameters.



Fully define Power Spectra in both bands, using either a Broken Powerlaw or several Lorentzians.

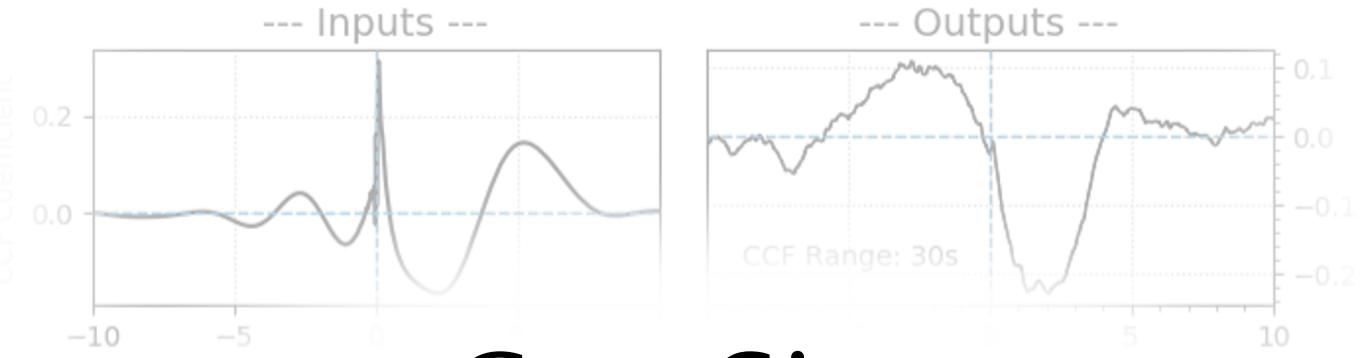
Control the lags between bands at each Fourier frequency using several descriptive distributions.

Also available as a Python function:

```
[In [1]: import CorrSim_Main_Function as CorrMain
[In [2]: CorrMain.CorrSim()
```



Download Here!



CorrSim

Available Now!

https://gitlab.com/astro_johnapaice/CorrSim

Preprint: <https://arxiv.org/abs/2208.10337>



See Examples Here!

Program currently in Beta testing!

- Is this helpful to you?
- Can you find any bugs, or areas for improvement?
- What features could be included to make this more useful to you?

Thank you!