Bayesian Analysis of Galaxies for Physical Inference and Parameter EStimation

"bagpipes"

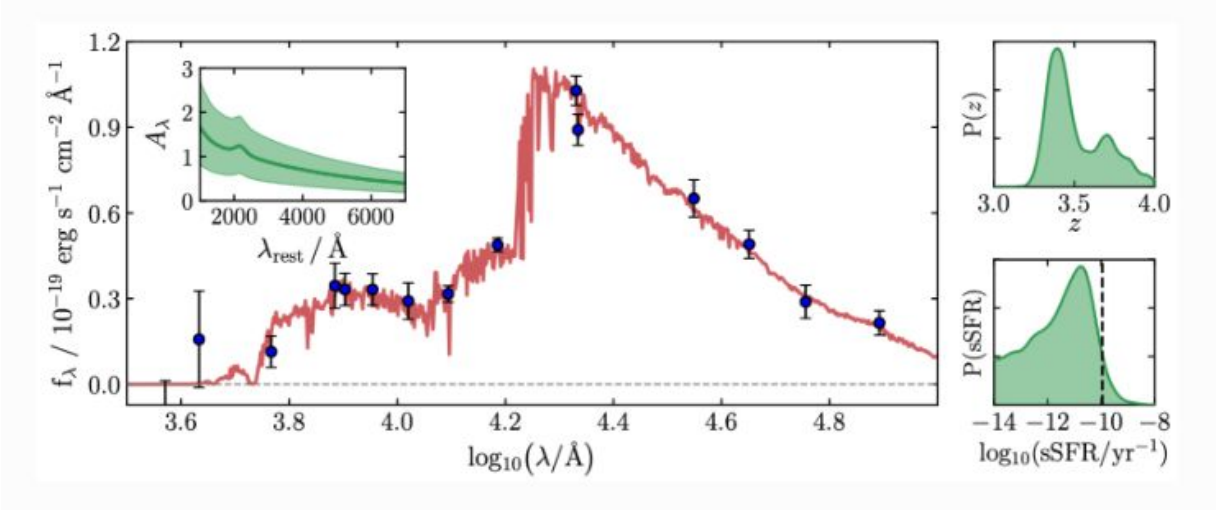
developed by A. C. Carnall - github.com/ACCarnall/bagpipes

Carnall+2018, Carnall+2019b

What is bagpipes?

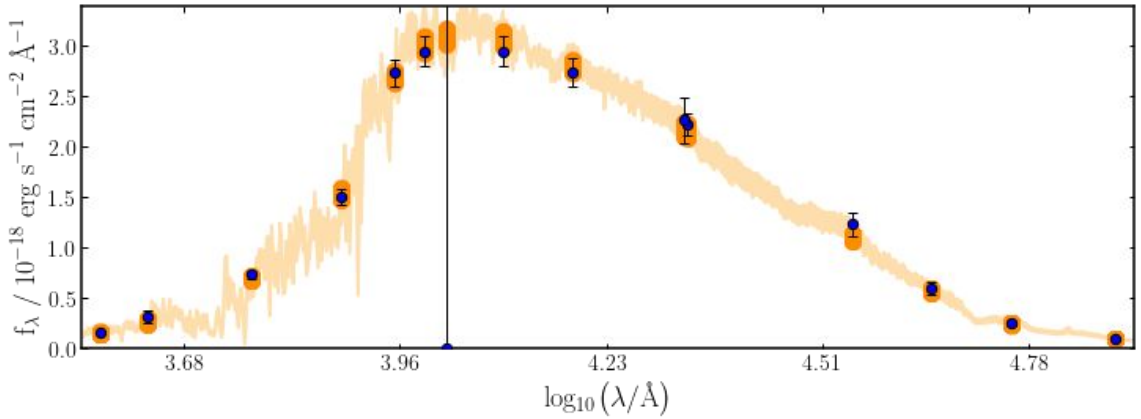
python code for

- modelling galaxy spectra
- SED fitting
- spectroscopic fitting



today

- SED fitting
  w/ HST & JWST photometry



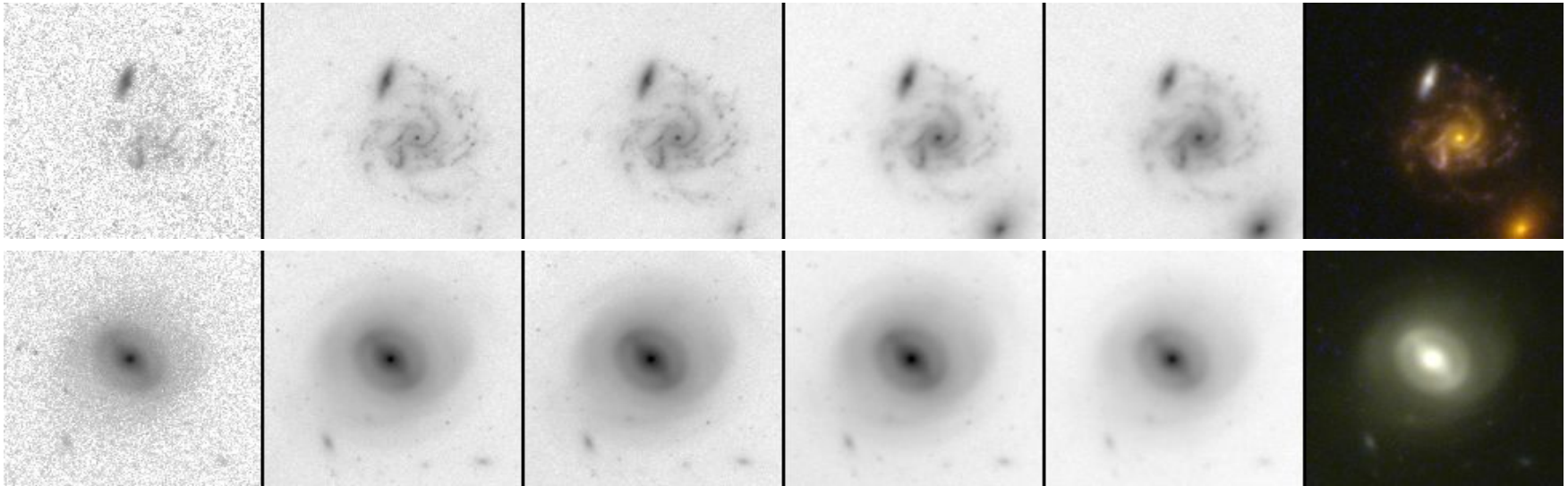
What do we need?

→ prepped photometry catalog
phot_cat_bagpipes.csv

- Photometry
  - flux and flux errors in several filter bands
    - from personal experience >5
- filter transmission curves

  http://svo2.cab.inta-csic.es/svo/theory/fps3/index.php?mode=browse

Abell 2744 galaxies (selected by eye)
DJA cutout
(GLASS+UNCOVER+DD-2756)
https://dawn-cph.github.io/dja/index.html



How does it work?

- bagpipes can fit single objects
- the better tool usually will be `pipes.fit_catalogue()`
  - define a load photometry function
  - a model component dictionary
    - global parameters - redshift, velocity dispersion, ...
    - SFH parameters - burst, constant, exponential, dblplaw, custom
    - Nebular component
    - Dust attenuation & emission

Outputs

- creates a catalogue

  if you use `pipes.fit_catalogue()`

Table Columns for 1: intro_bagpipes_burst.fits

Index	Visible	Name	$ID	Class	Description	Format
0	☐	Index	$0	Long	Table row index	
1	☑	#ID	$1	Character		1A
2	☑	burst:age_16	$2	Double		D
3	☑	burst:age_50	$3	Double		D
4	☑	burst:age_84	$4	Double		D
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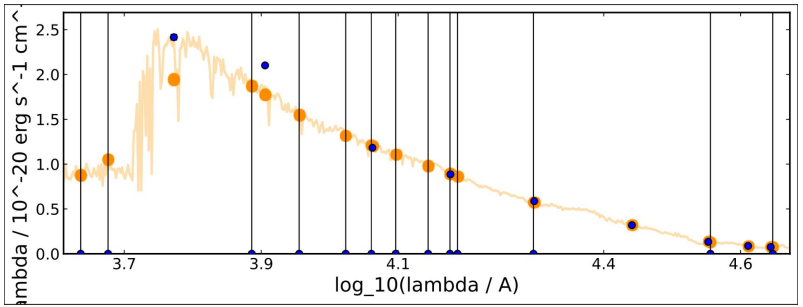
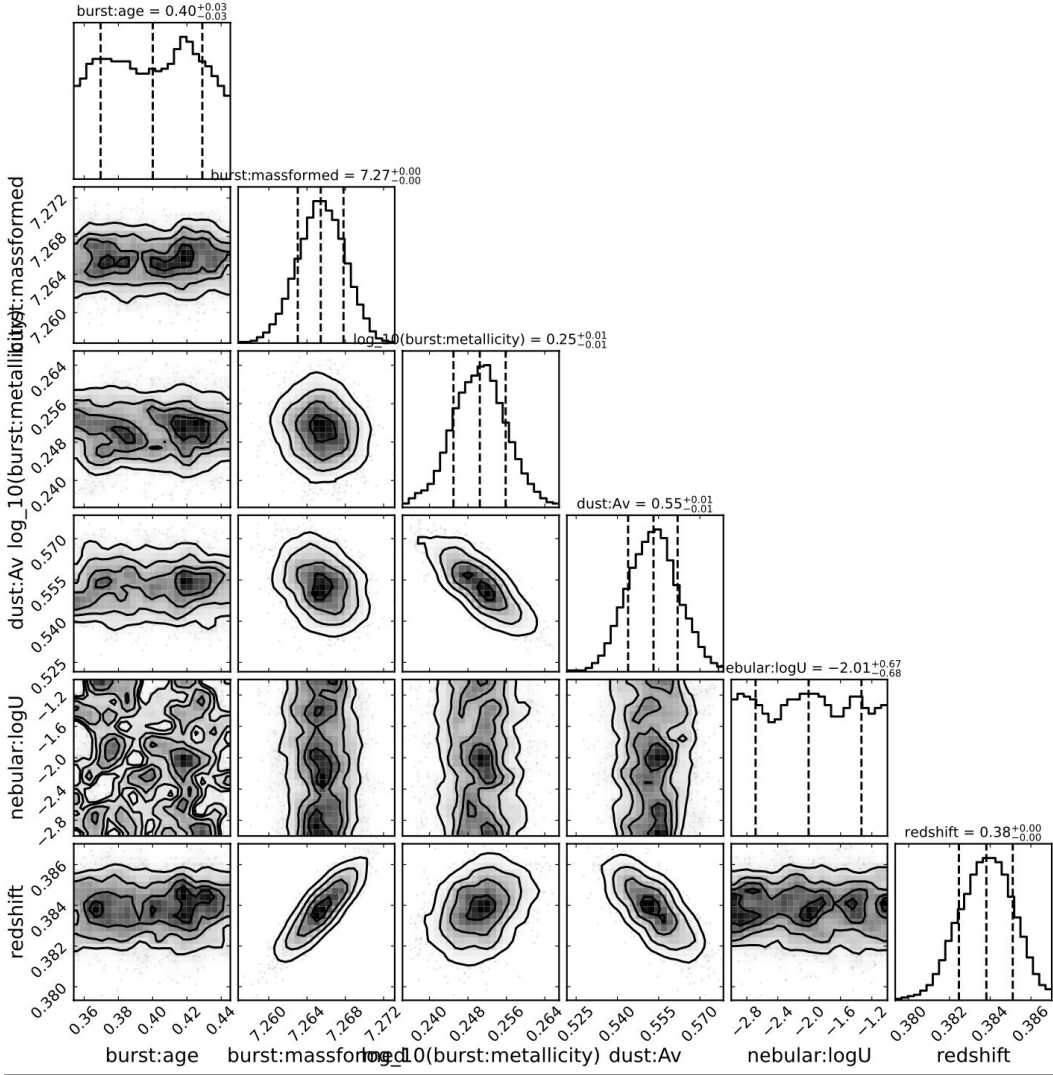
Outputs

- creates a catalogue
- makes default plots
  (corner plot, posterior dist, fit, sfh)
  - latex!





Outputs

- creates a catalogue
- makes default plots (corner plot, posterior distributions, fit)
  - bagpipes uses latex, so it looks best when it finds a latex distribution
- saves posterior distributions in .h5 file
  - bagpipes returns & saves the median of the distribution and errors around that
  - can extract the max likelihood parameters & model
  - see on github.com bagpipes/examples/Further Examples 1 - Extracting_the_maximum_likelihood_model.ipynb