Simulating Stellar Populations of Edge-On Galaxies to Study Galactic Formation

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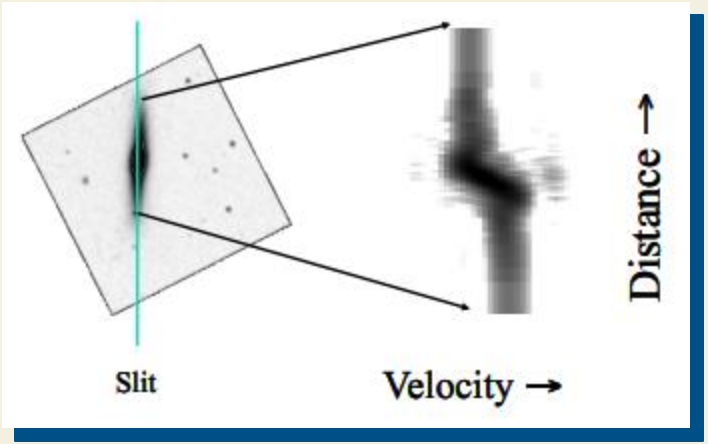
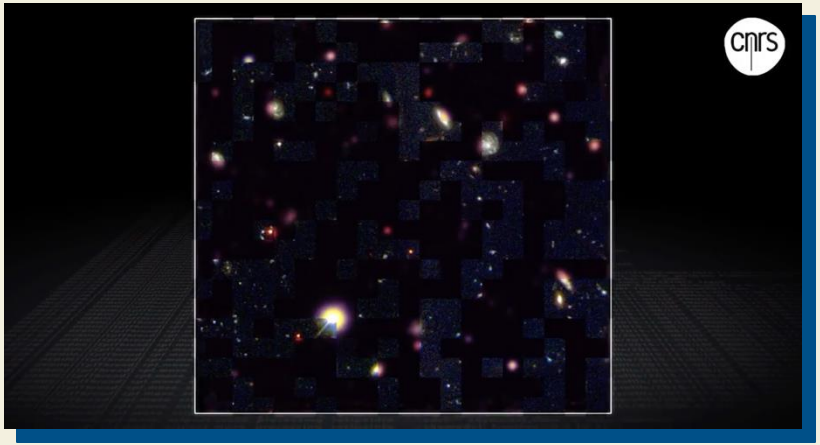
How do galaxies form and evolve over time?

Spectra of the stars inside of them

Background: Revolutions in Data Collection





Old Method: Slit Spectroscopy

- One spectrum for entire galaxy

New Method: Integral Field Spectroscopy

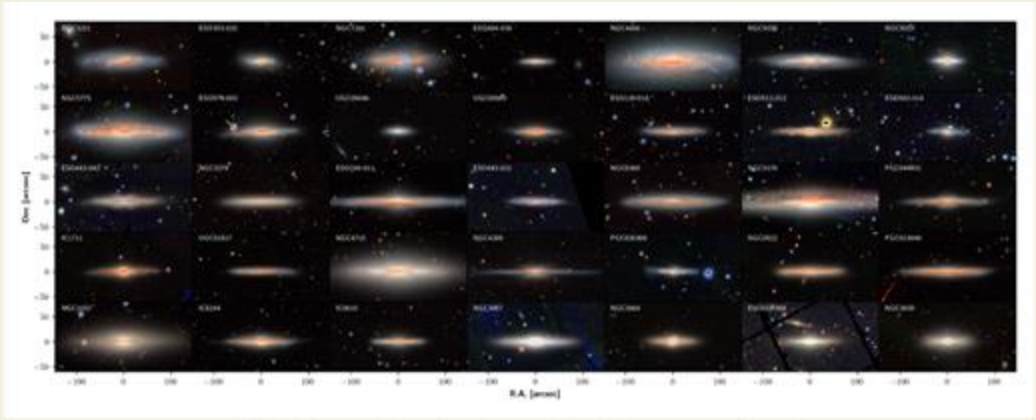
- Spectrum for every single pixel
- MUSE
  - More requests than JWST!

Background: What We've Discovered

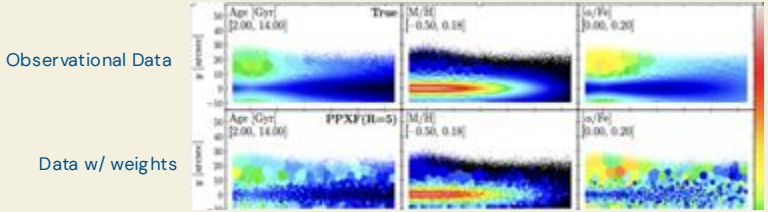
NGC 5746

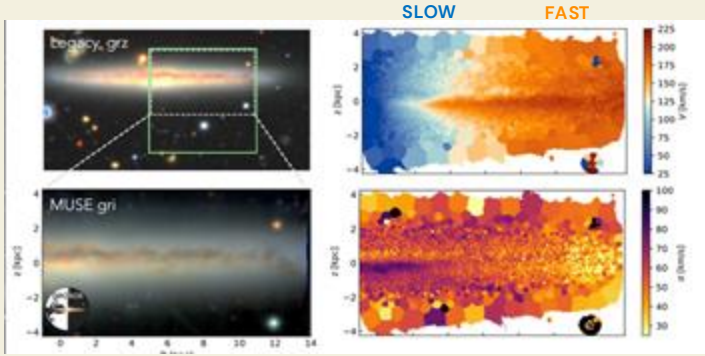
- Theory (ΛCDM) says massive disc galaxies are thought to need significant mergers to build up
  - These mergers tend to produce large bulges
  - Stars orbits are random
- New observations show some galaxies lack tidal features and large bulges that indicate a merger

Comparing Galaxies



GECKOS survey Galaxy family portrait. Credit: Jesse van de Sande





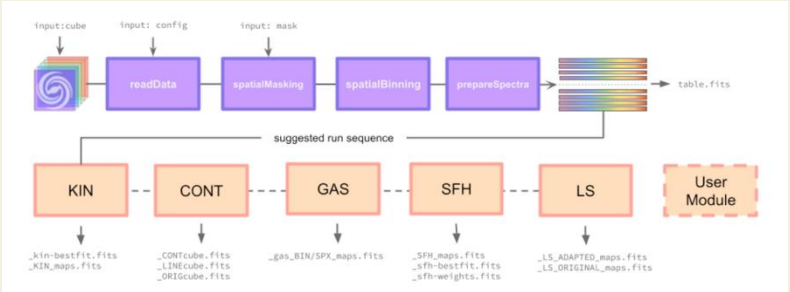
- GECKOS
  - Large sampling of galaxies similar to the Milky Way
  - **SIMILARITIES:**
    - Mass & Luminosity
  - **DIFFERENCES:**
    - Age, Star Formation Rate, Physical Structures

Goals for the Summer

Measure the characteristics of stars in GECKOS galaxies to determine what processes govern the structure & composition of a galaxy

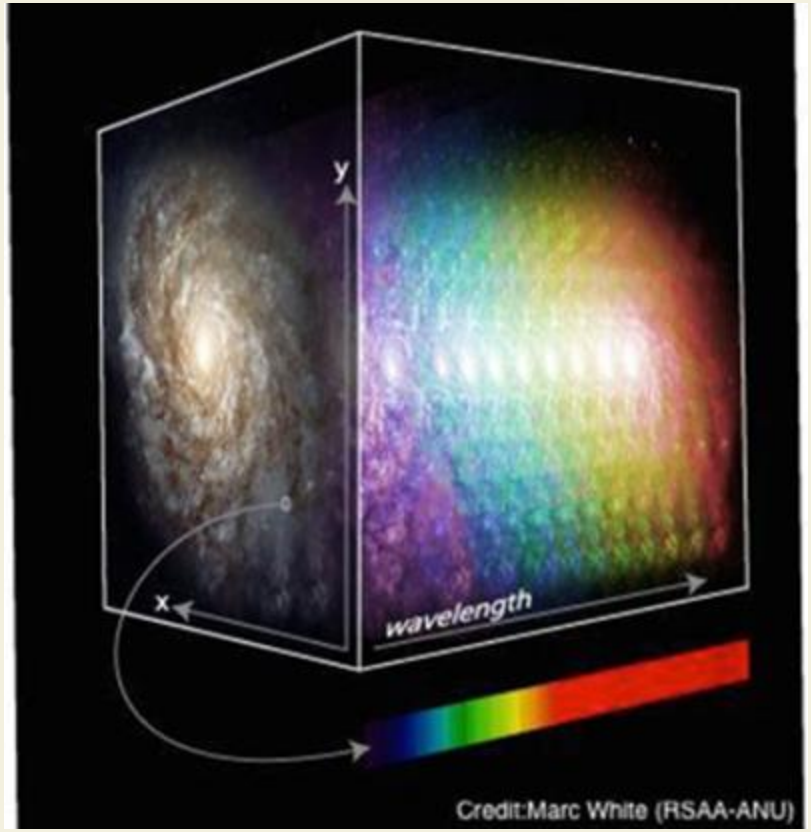
Compare Galaxies' Stellar Populations through nGIST pipeline

- Strong bar vs. no bar, High Star Formation vs. Low Star Formation
- MILES, Pegase, FSPS Models



Questions?

3 rules:
-no wishing for death
-no falling in love
-no bring back dead people
I wish to work in astrophysics without ever having to do programming
There are 4 rules


y
x
wavelength
Credit:Marc White (RSAA-ANU)