Spotted Python

Week 5 Tutorial

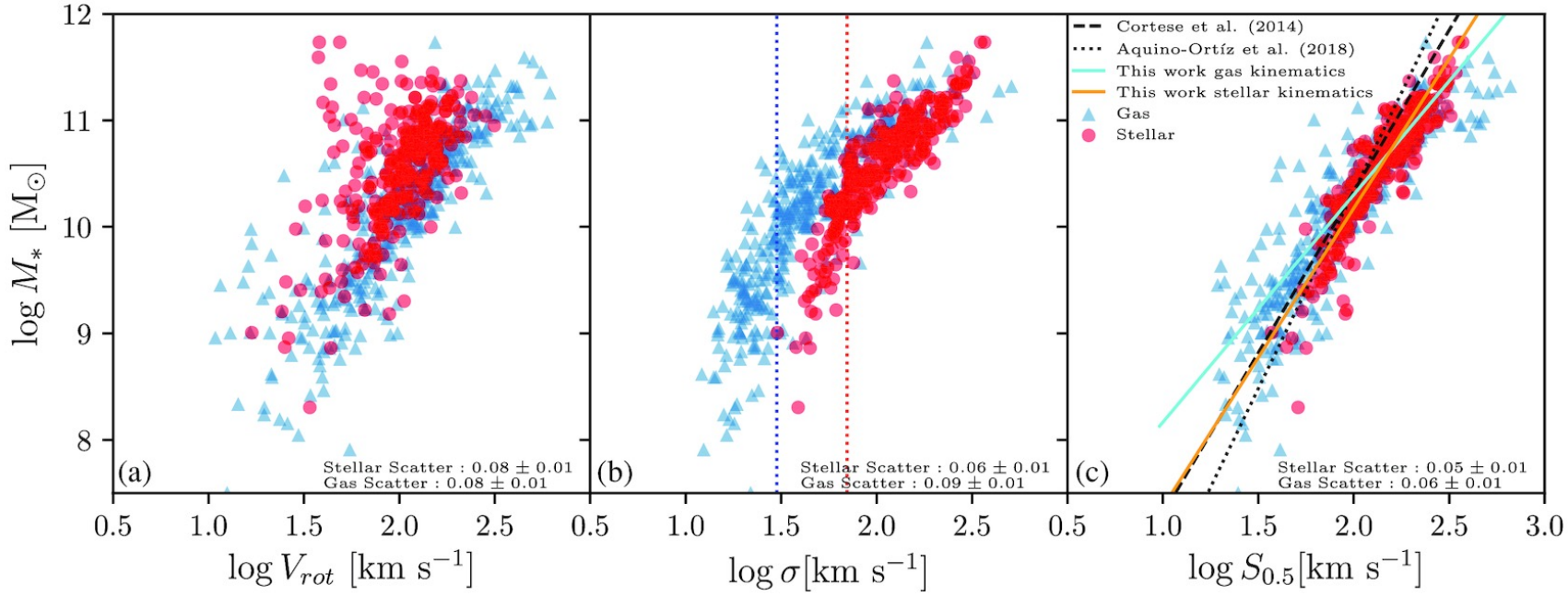
- Scaling Relations
- Fitting a linear curve
- BPT Diagram

SAMI Scaling Relations

- Combining rotation and dispersion (Barat+2019):

$$S_{0.5} = \sqrt{0.5V_{rot}^2 + \sigma^2}$$

- Considers both ordered and stochastic motions
- Complete **Exercise 1**



Curve Fitting

- Many functions allow for curve fitting, e.g.
  - scipy.optimize.curve_fit
  - scipy.odr
- Throughout physics, you will most often need to fit linear and Gaussian functions
- Complete **Exercise 2**

BPT Diagram

- Simple Diagnostic Diagram (Kewley+2006)
  - *HII & Composites*: $\log\left(\frac{[OIII]}{[OII]}\right) < -1.701\log\left(\frac{[OI]}{H_\alpha}\right) - 2.163$
  - *LINERS*: $\log\left(\frac{[OIII]}{[OII]}\right) < 1.0\log\left(\frac{[OI]}{H_\alpha}\right) + 0.7$
  - *Seyferts*: $\log\left(\frac{[OIII]}{[OII]}\right) > 1.0\log\left(\frac{[OI]}{H_\alpha}\right) + 0.7$
- What are HII, LINERS, Seyferts?

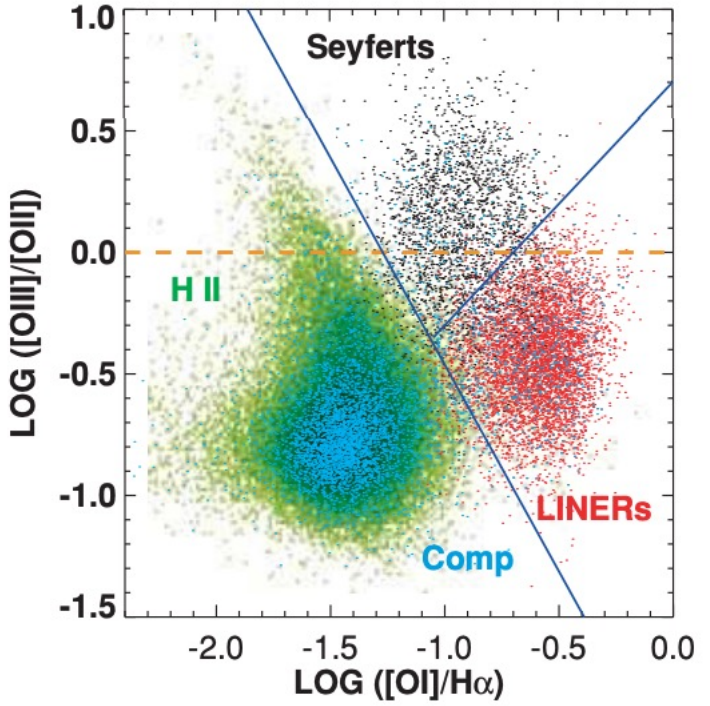


Figure 5. The [O III]/[O II] versus [O I]/Hα diagnostic diagram for SDSS galaxies with S/N > 3. Galaxies have been classified using the standard BPT diagnostic diagrams (Fig. 4). Ambiguous galaxies are not included. Our new preferred classification scheme is shown in blue. The H80 LINER line (orange dashed) is also shown.

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SDSS Navigate Visual Tool

- https://skyserver.sdss.org/dr18/VisualTools/navi
- Select an emission line galaxy with a measured spectrum
- Using the flux (EW), place the objects on the $\log\left(\frac{[OIII]}{[OII]}\right)$ vs $\log\left(\frac{[OI]}{H\alpha}\right)$ plot
  - Wavelengths of the emission lines: [O I] λ6300, [O II] λλ3726, [O III] λ5007, [Hα] λ6564
  - λλ indicates that you must sum across the doublet near those wavelengths
- Determine the type of emitter the galaxy is (**Exercise 3**)
- https://forms.gle/wy4tGoLycv5K48fN9

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Group Meeting Time

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