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HI and CO Velocity dispersions in nearby galaxies

Moses Mogotsi: HI & CO Velocity Dispersions in Nearby Galaxies
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Preliminary Results

Figure 1: Histogram of the HI/CO Dispersion ratio for the 14 galaxies in the sample; colour coded by galaxy.

- Importance: SFR, Turbulence, [Dynamics]

- Performed a pixel-by-pixel analysis of the HI and CO velocity dispersions in 14 THINGS and HERACLES galaxies. Sampled CO and HI dispersions > 5.2 km.s$^{-1}$ (due to velocity resolution of data).

- Fitted mean between galaxies (log Normal):
  - Dispersion Difference: 7.7 ± 2.3 km.s$^{-1}$ HI-CO
  - (inclination-corrected: 4.8 ± 2.0 km.s$^{-1}$)

- Dispersion Ratio: 1.8 ± 0.22 HI/CO
Preliminary Results

Dispersion Difference is not smooth across galaxies and varies across galaxies.

Average CO dispersion linearly related to SFR Density \( (0-2 \text{M}_{\odot} \text{yr}^{-1} \text{kpc}^{-2}) \), becomes non-linear at high SFR density and relation is not clear for \( 0-0.5 \text{M}_{\odot} \text{yr}^{-1} \text{kpc}^{-2} \); large variation of gradients between galaxies.

Tighter correlation between CO and SFR than with HI.

Figure 2: Plot of the Average CO dispersion per value of star formation rate density for 13 galaxies in the sample. Gradients and \( R^2 \) of fits for every galaxy noted in the legend.