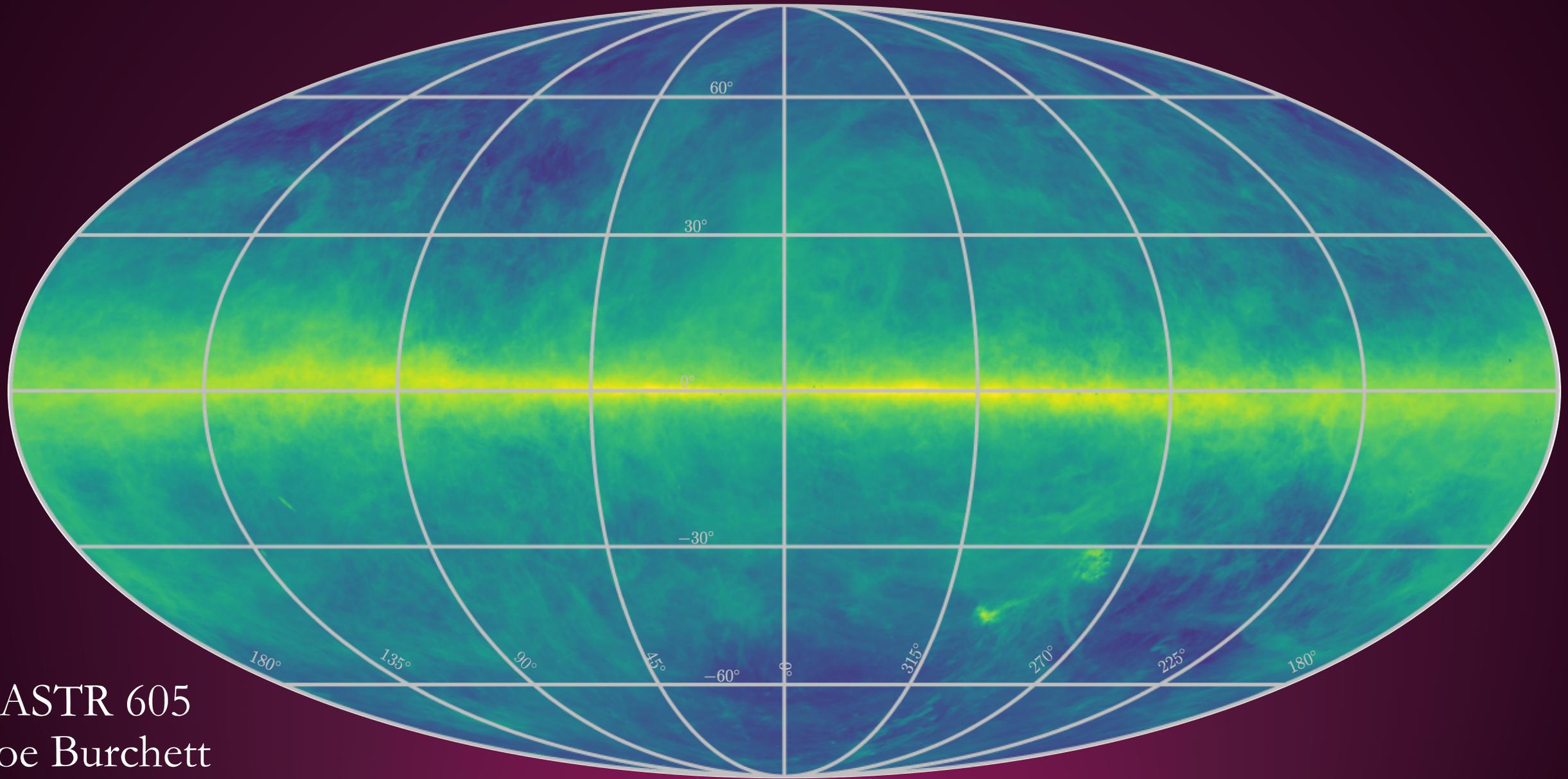


# Intro to Neutral Media



ASTR 605  
Joe Burchett  
9/22/2021

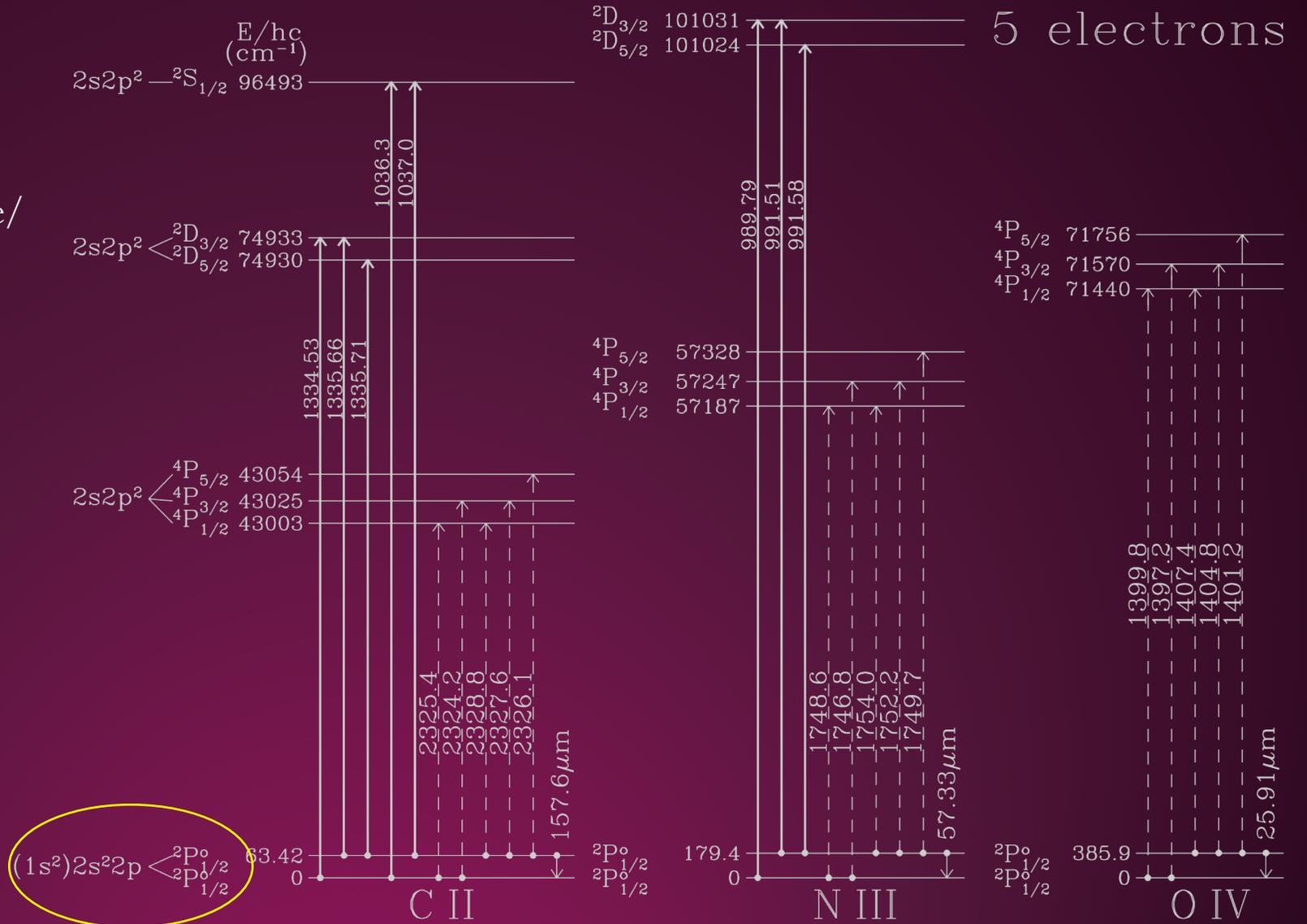
HI4PI collaboration et al. 2016

# First, some clarifications

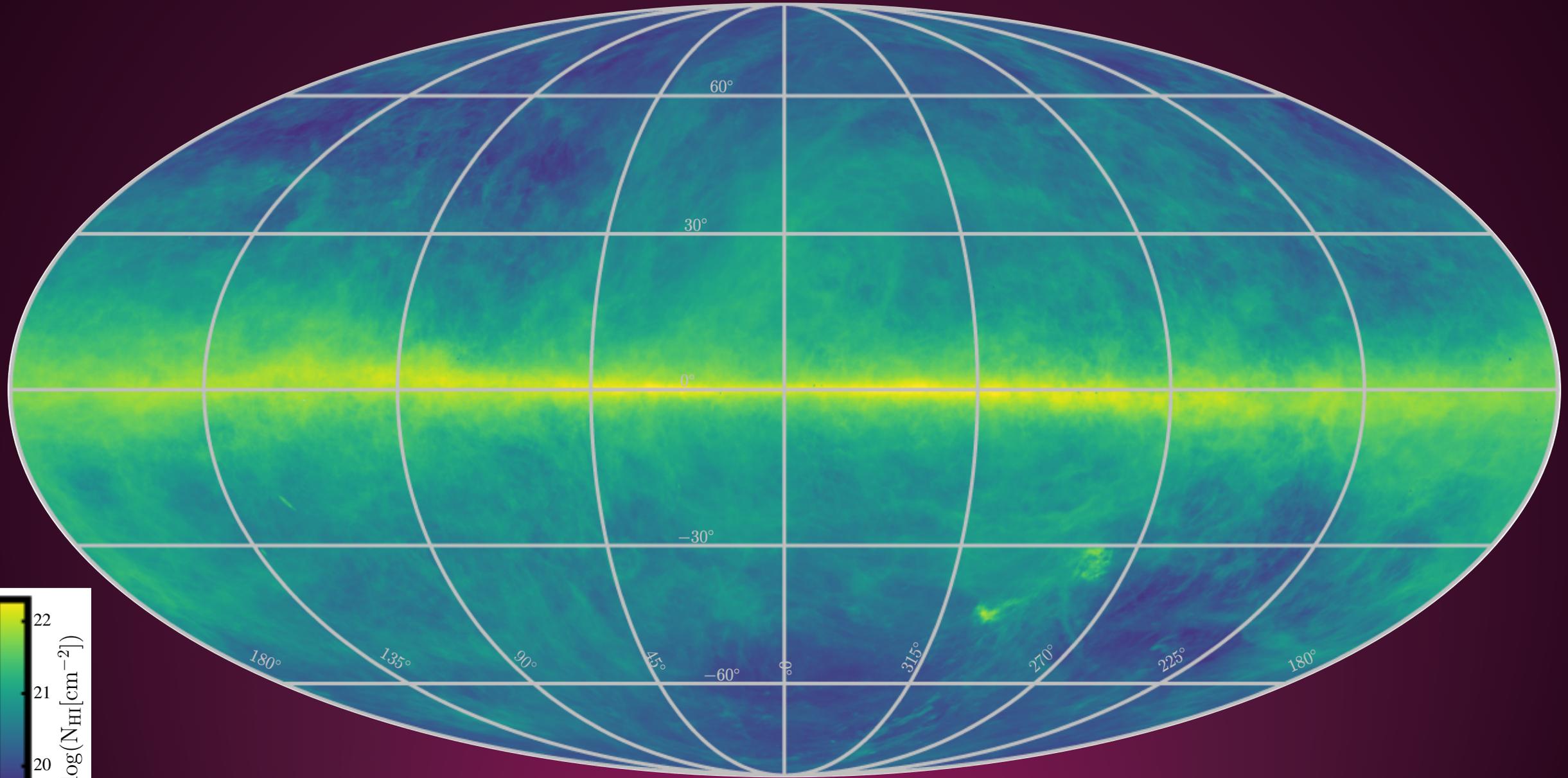
---  $(13.6 \text{ eV})/hc = 109692 \text{ cm}^{-1}$  ---

Check out the book errata:

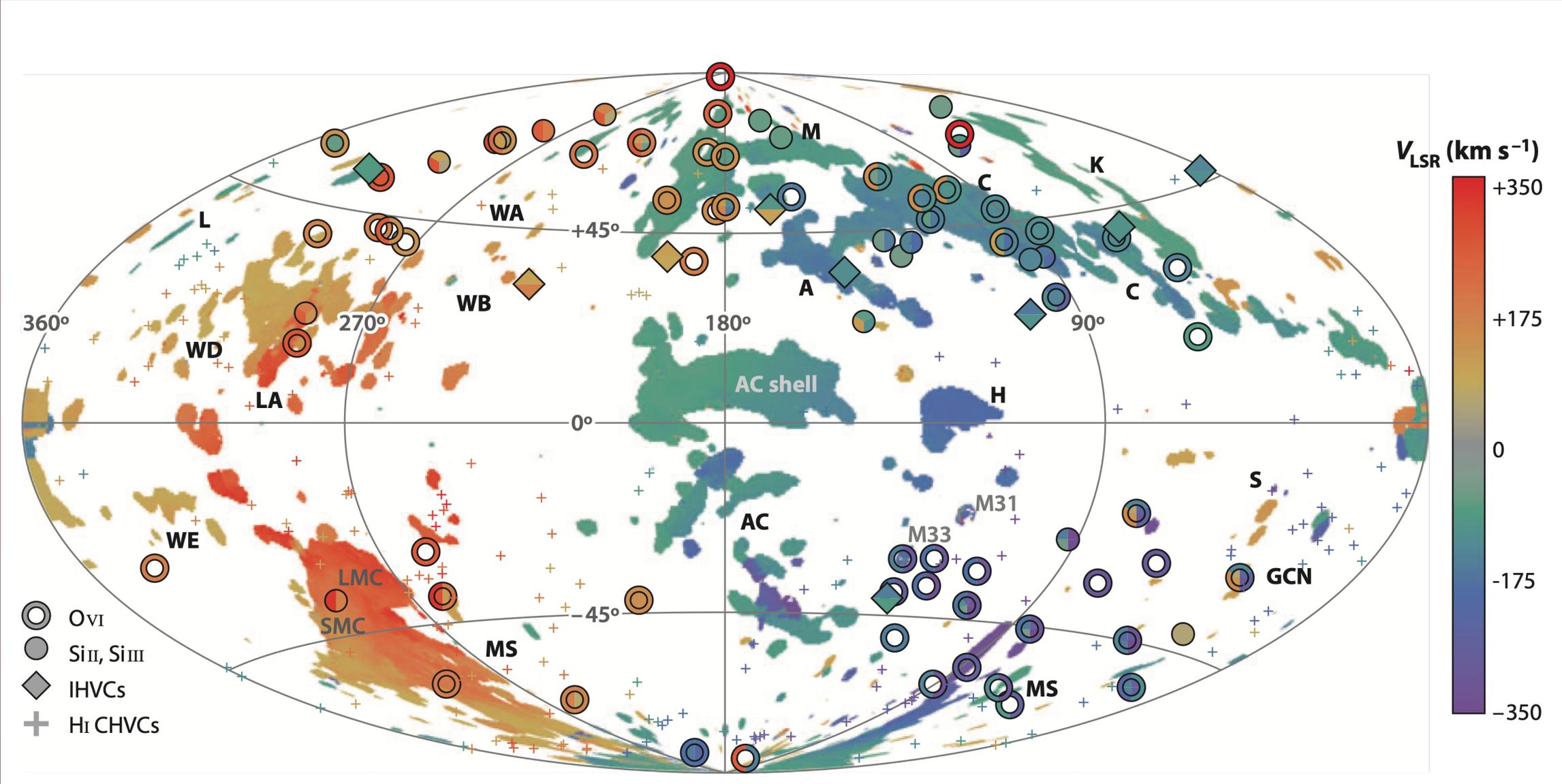
<https://www.astro.princeton.edu/~draine/>



# 21cm neutral hydrogen 'spin flip' transition



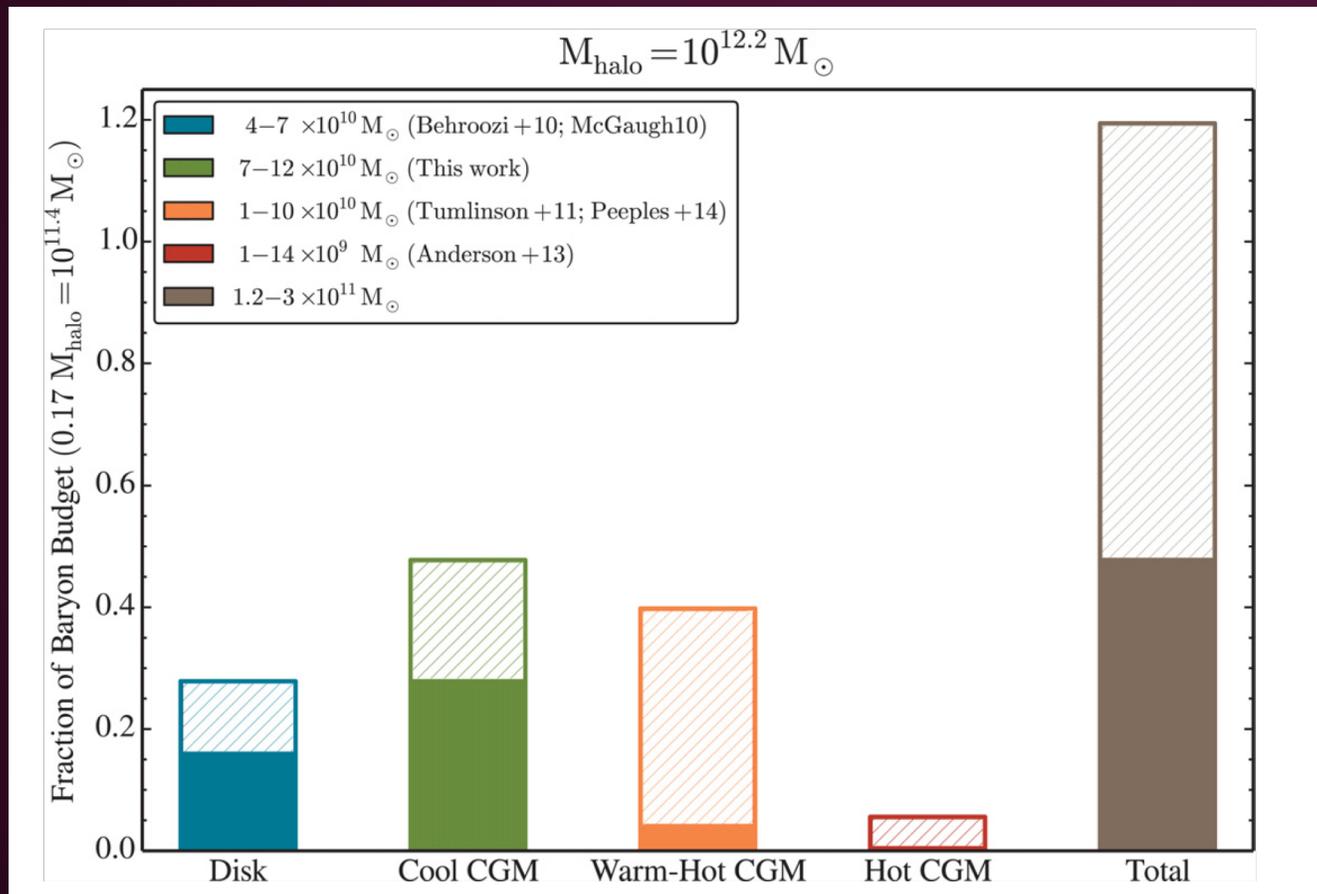
# H I in the Milky Way halo/high velocity clouds



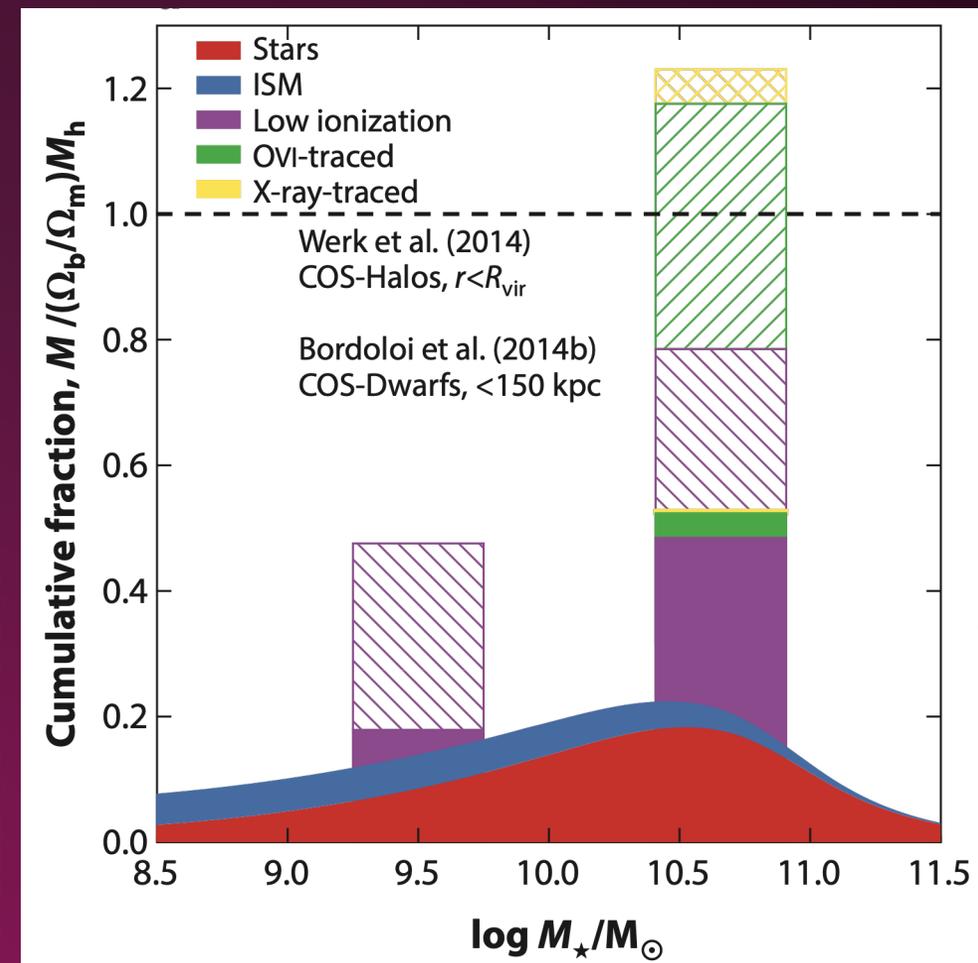
# Vital stats

For gas in the Milky Way disk, 60% is in H I

- NOTE: Much more gas mass resides in the circumgalactic medium, which is predominately (>99%) ionized.



Tumlinson et al. 2017



Werk et al. 2014

# Vital stats

Most of what we know about the H I distribution in our own galaxy and others comes from radio telescopes (via the 21cm or 1.4 GHz spectral line)

Green Bank Telescope

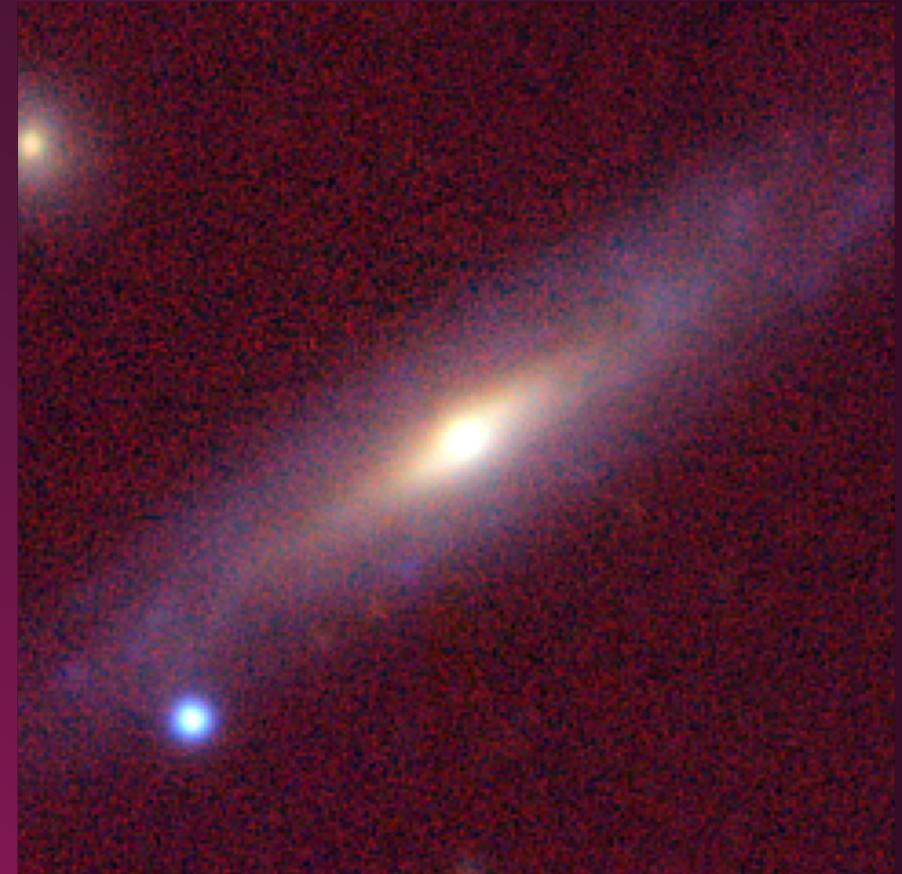
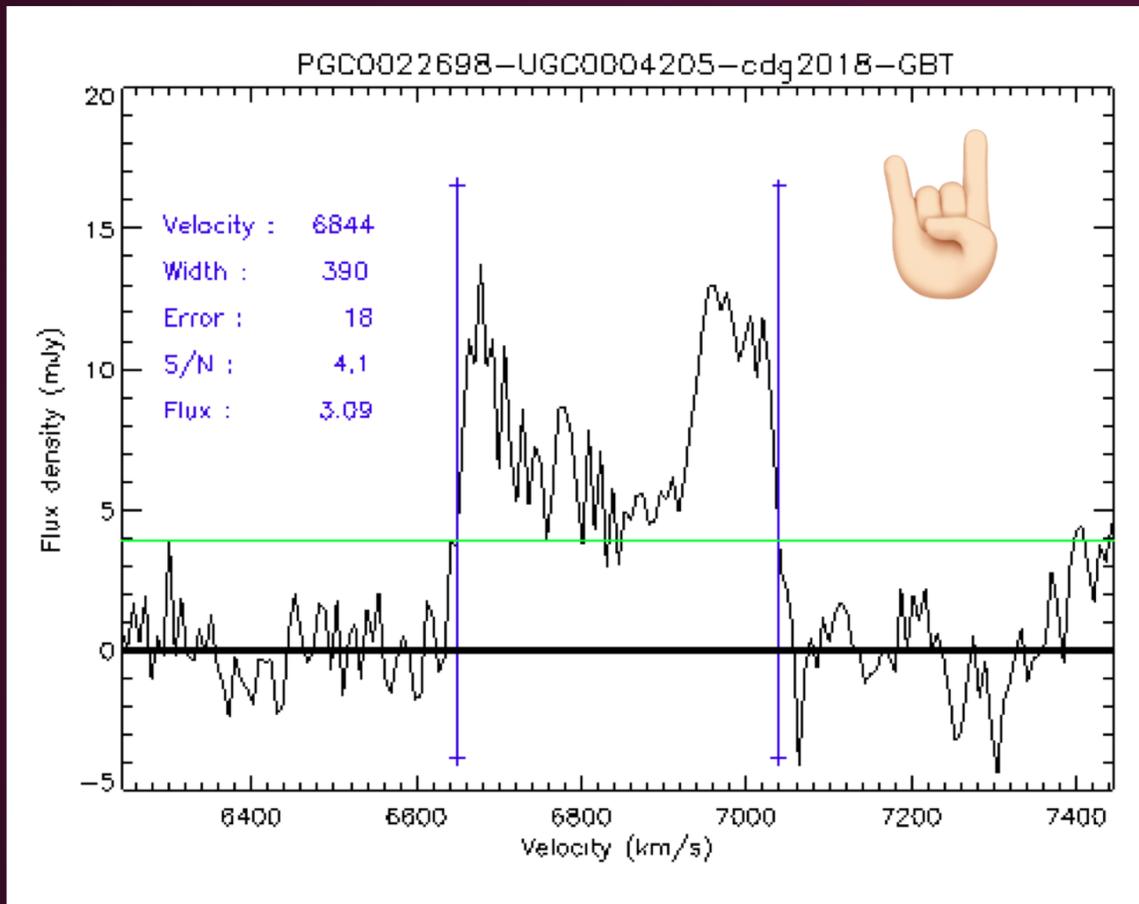


Very Large Array



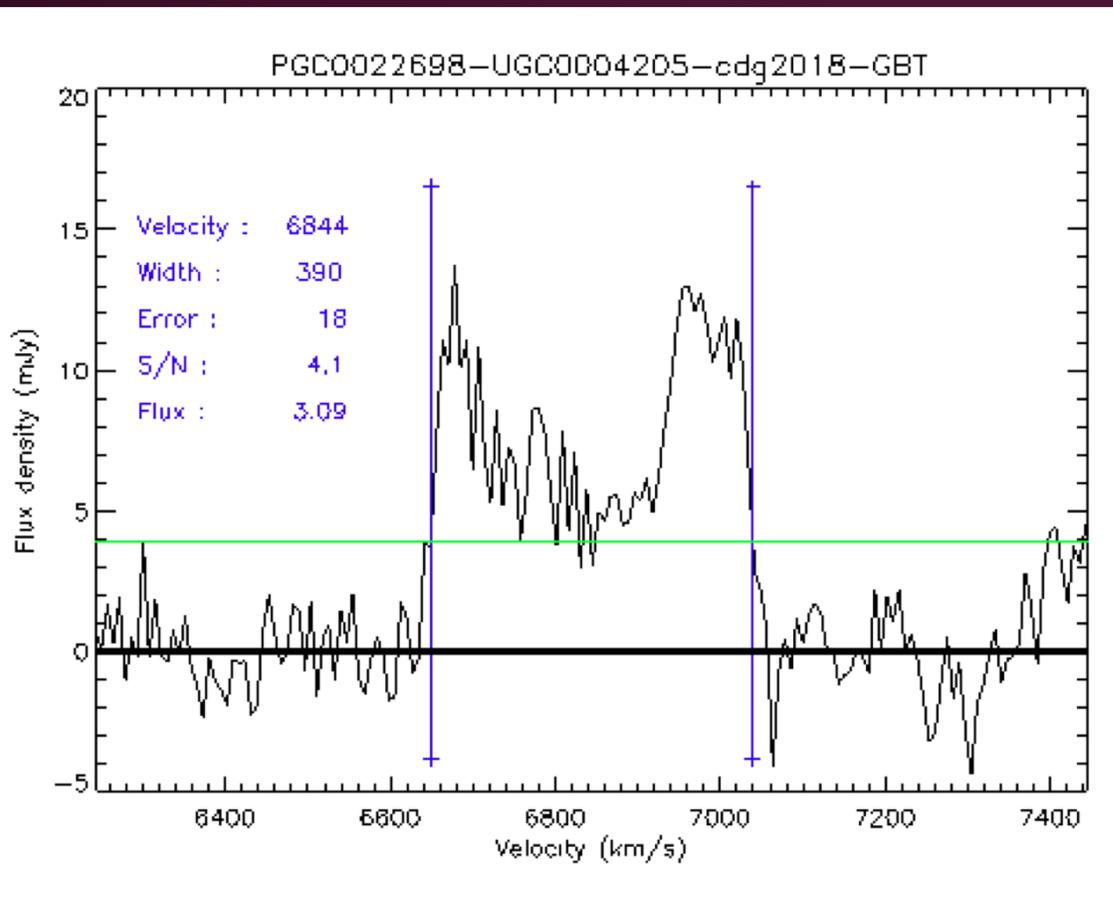
# Vital stats

‘Double-horned’ profile of integrated (entire galaxy) 21cm emission reveals rotation curve flattening.



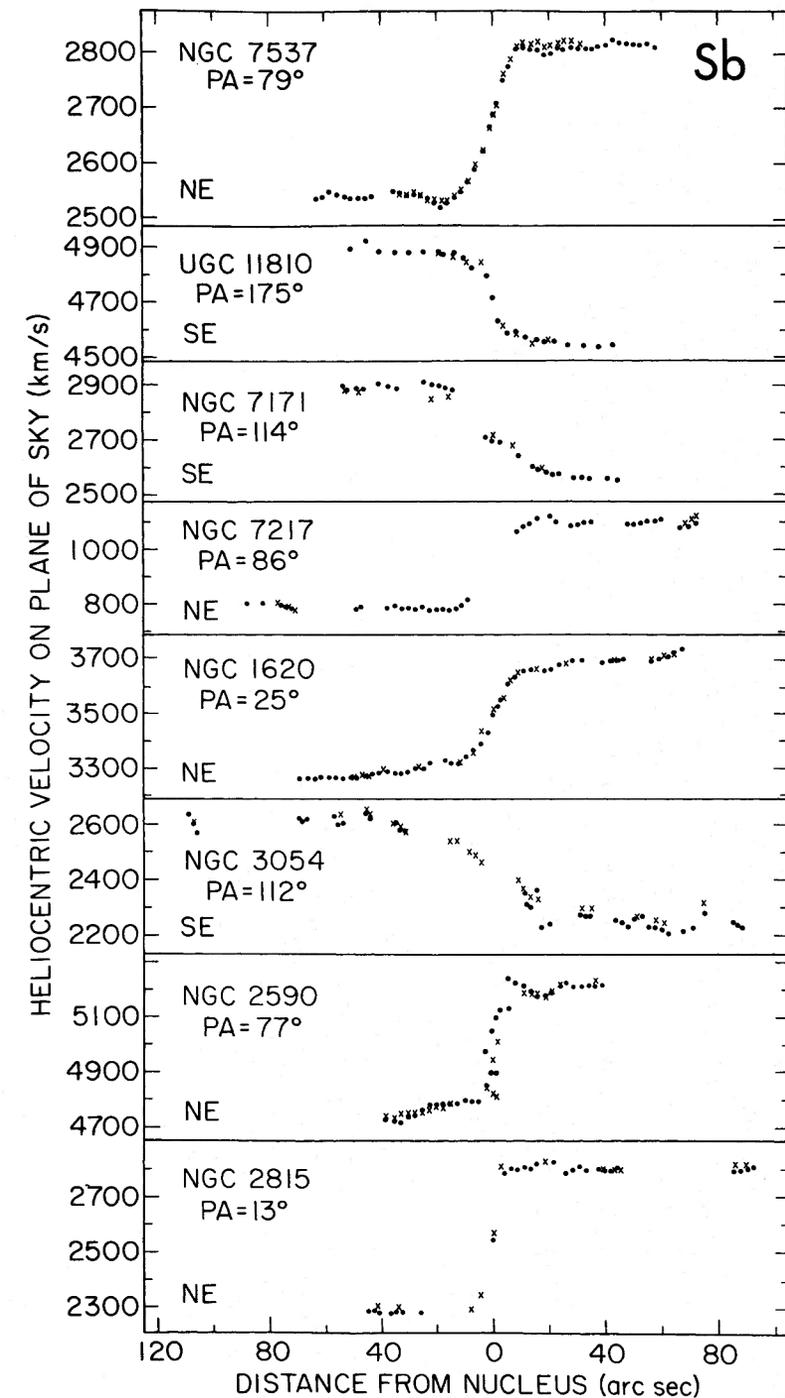
# Vital stats

‘Double-horned’ profile of integrated (entire galaxy)  
21cm emission reveals rotation curve flattening.



Dupuy et al. 2021

Rubin et al. 1982



# 21 cm Emission Maps from Interferometry

