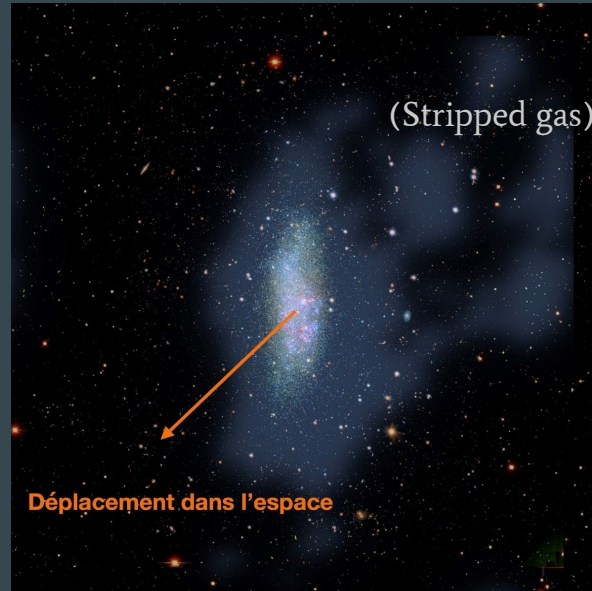


WLM: Dynamics of an Isolated Dwarf Irregular Perturbed by the IGM

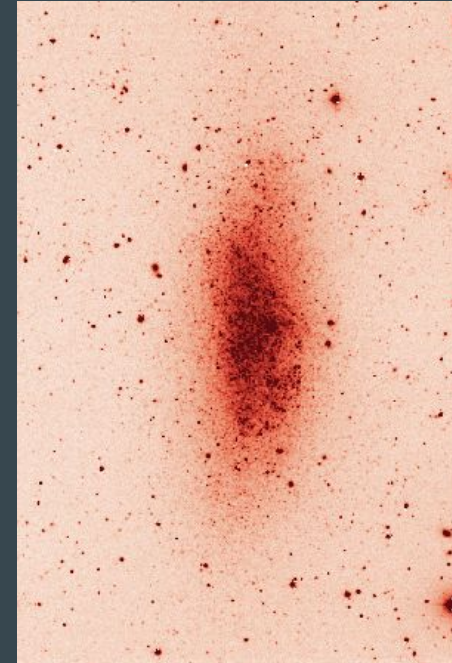
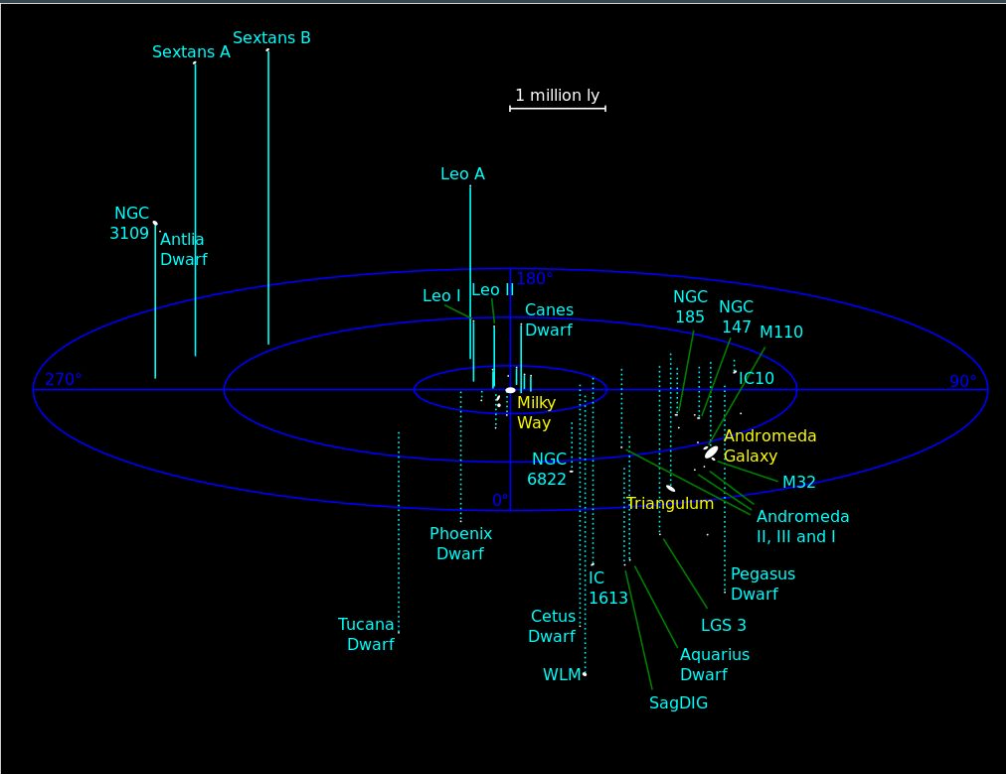


Yang 2022

Neel Kolhe,
Doctoral Candidate, Observatoire de Paris

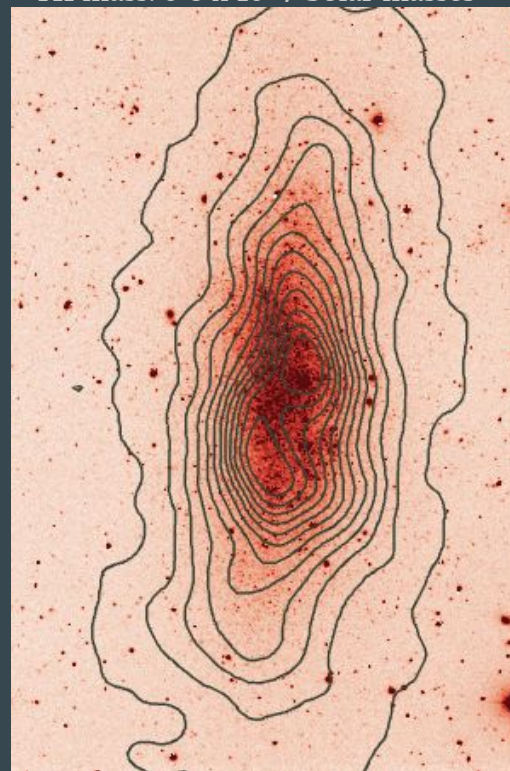
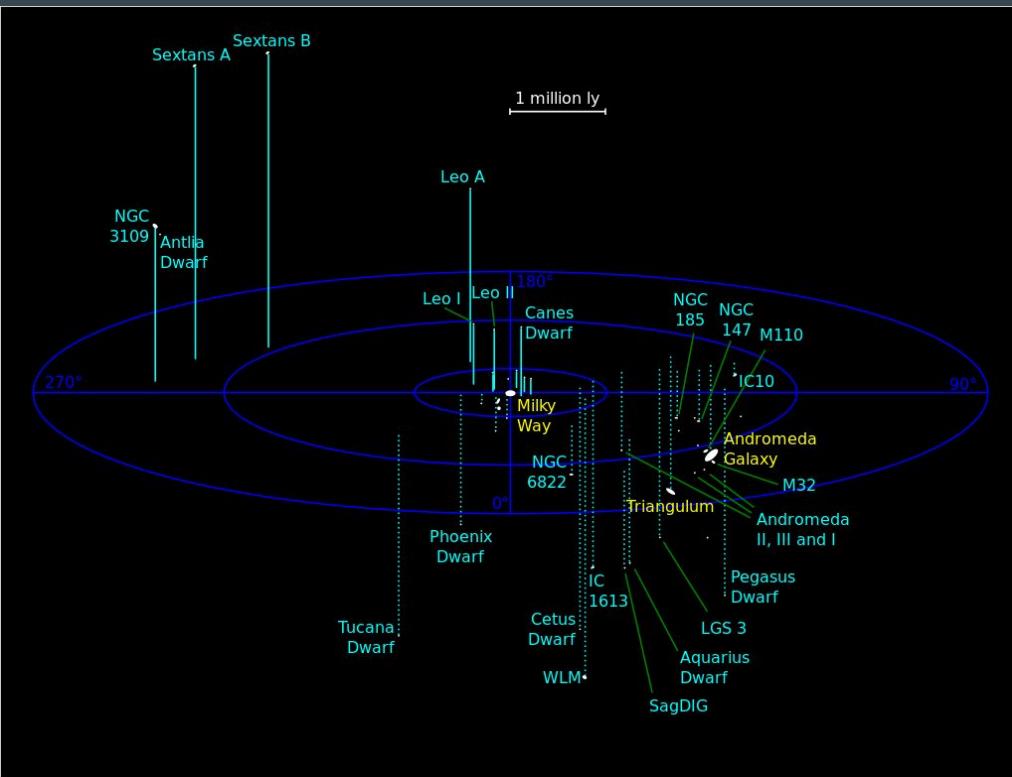
Meet Wolf–Lundmark–Melotte, WLM

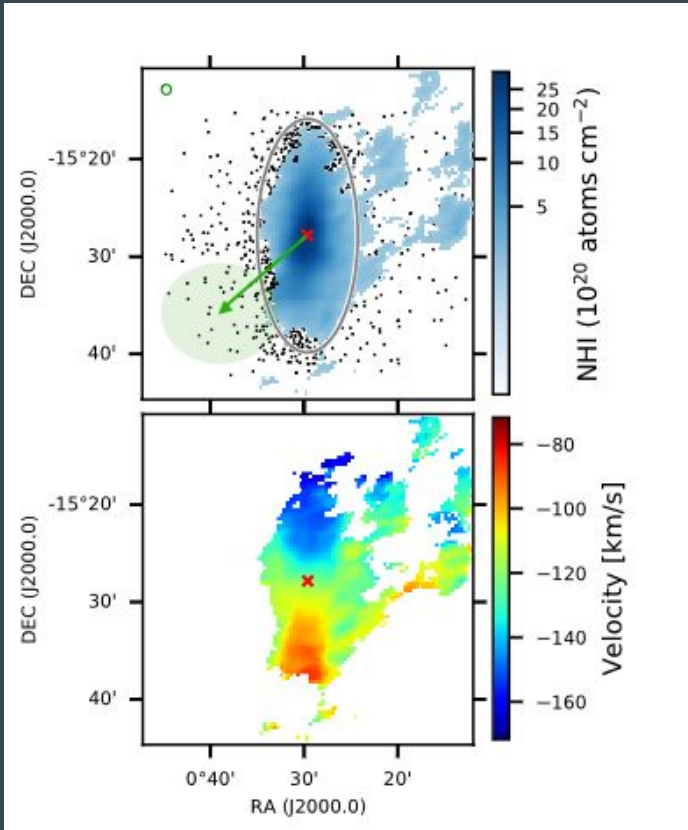
- Isolated, no recent mergers
- Gas rich, gas mass is $2\times$ stellar mass
Stellar mass: 2 to 4.3×10^7 Solar masses
HI mass: $6\text{--}8 \times 10^7$ Solar masses



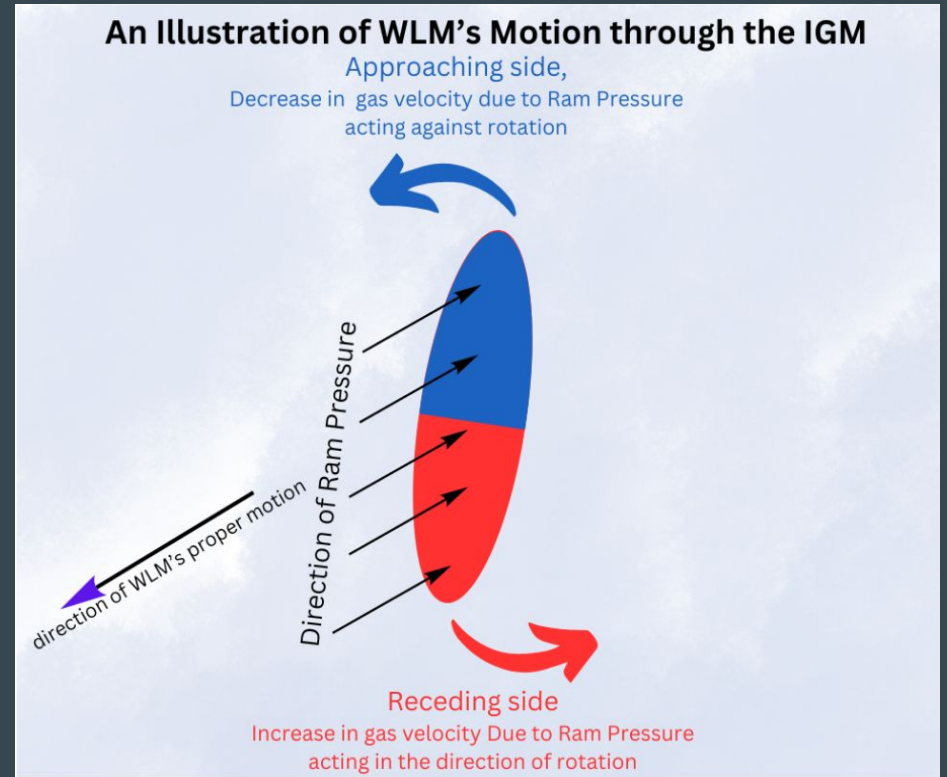
Meet Wolf–Lundmark–Melotte, WLM

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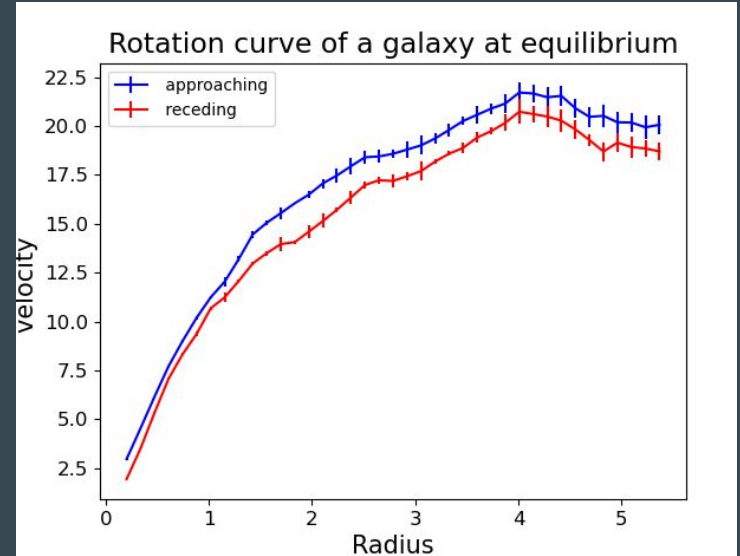
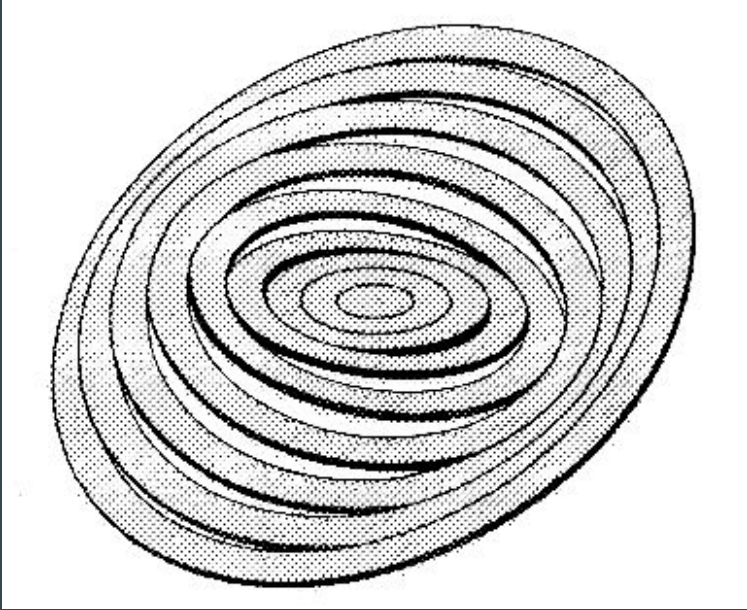


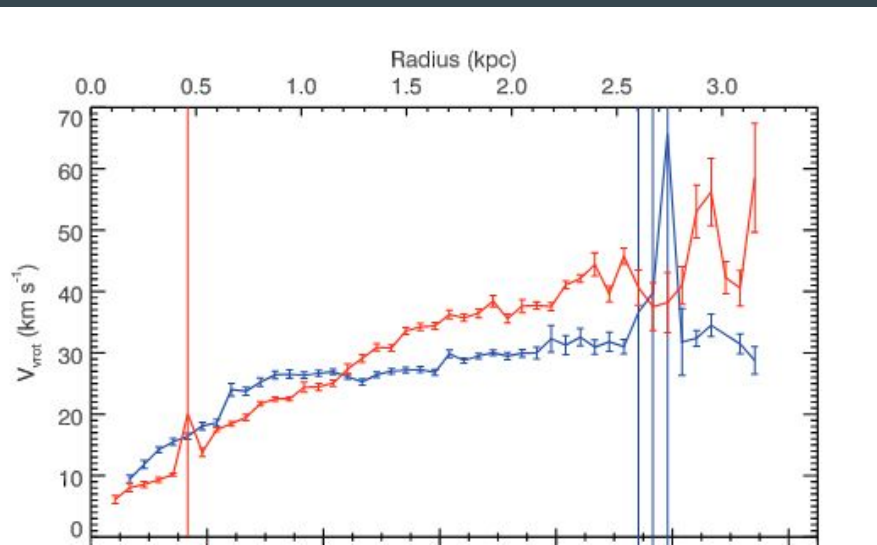
Clouds in the opposite direction of proper motion is
Strong evidence for ram pressure stripping due to the
IGM, only the second reported case in the local group



Ram pressure affects the gas in the galaxy asymmetrically

Dynamical Equilibrium and Rotation Curves

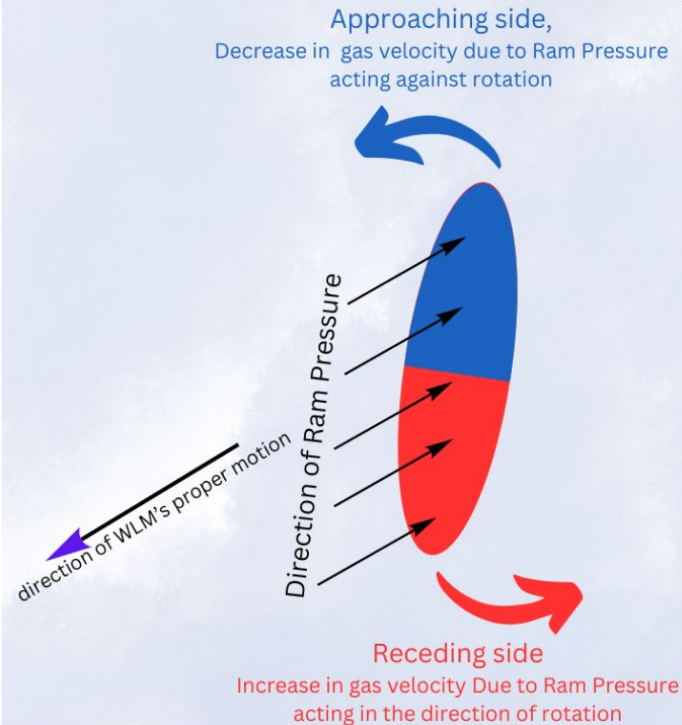


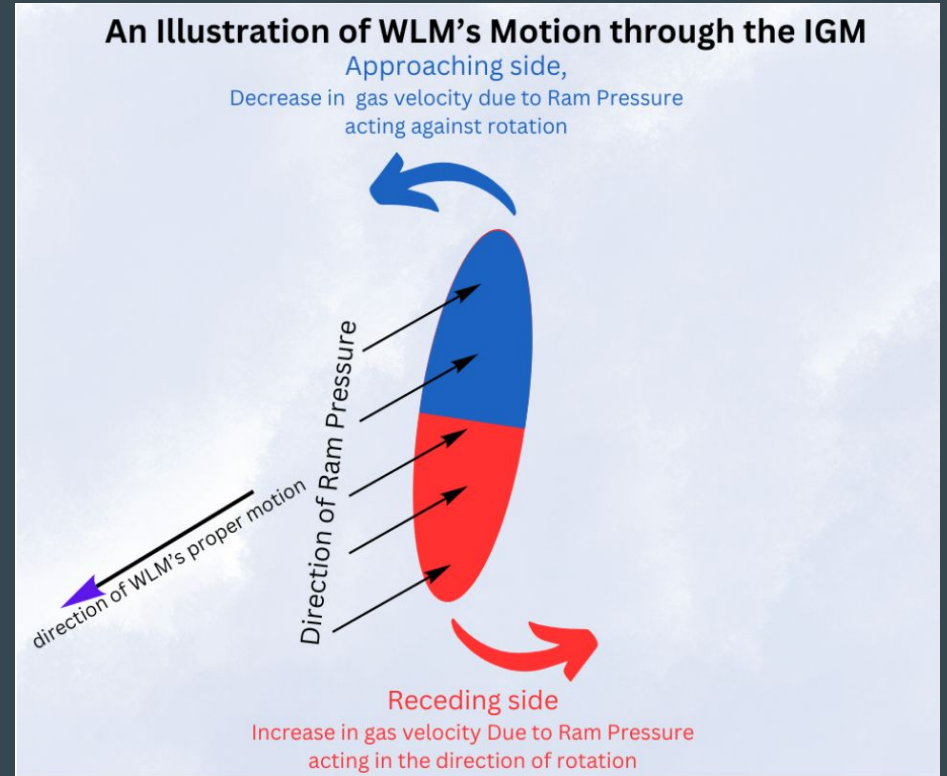
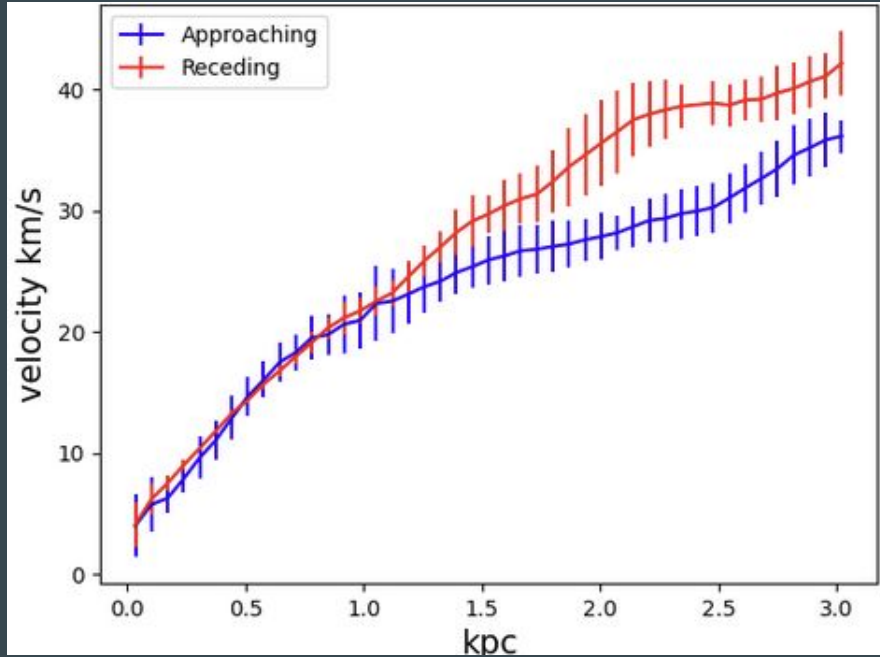


Kepley 2007

Asymmetric Rotation curve?

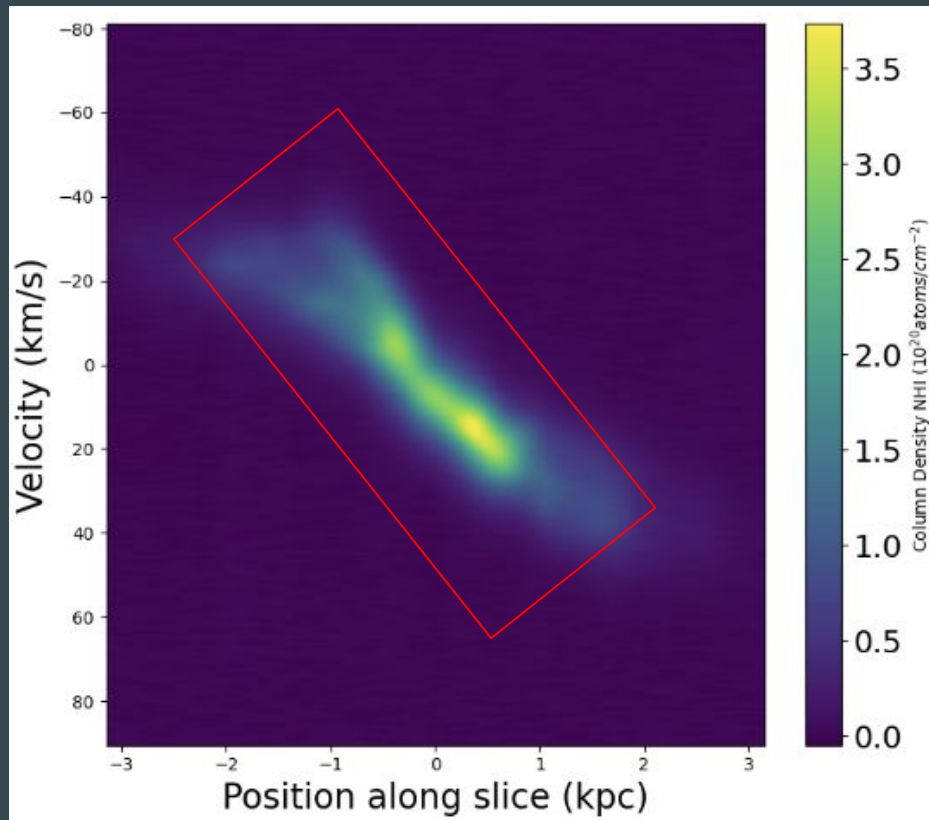
An Illustration of WLM's Motion through the IGM

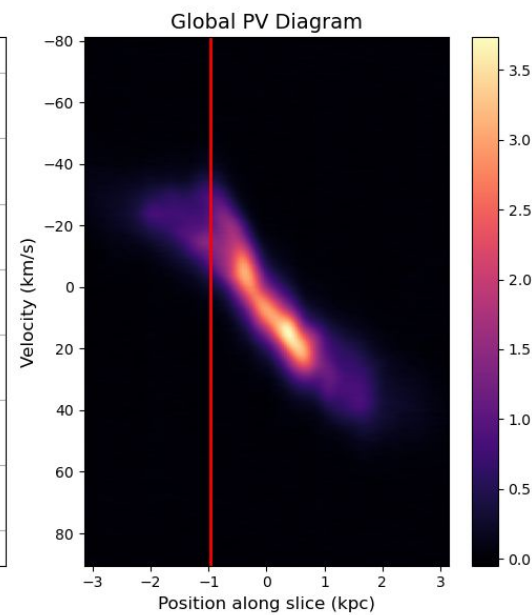
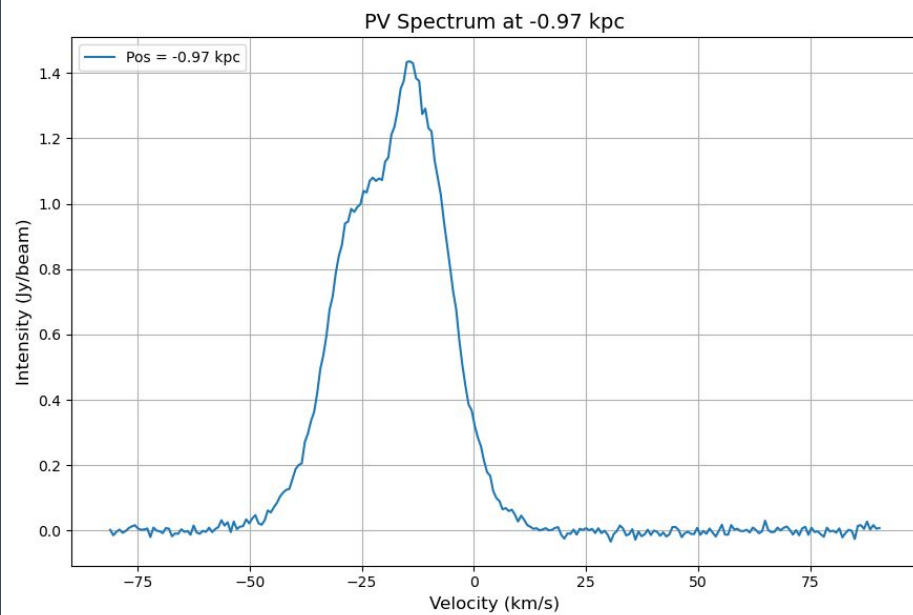




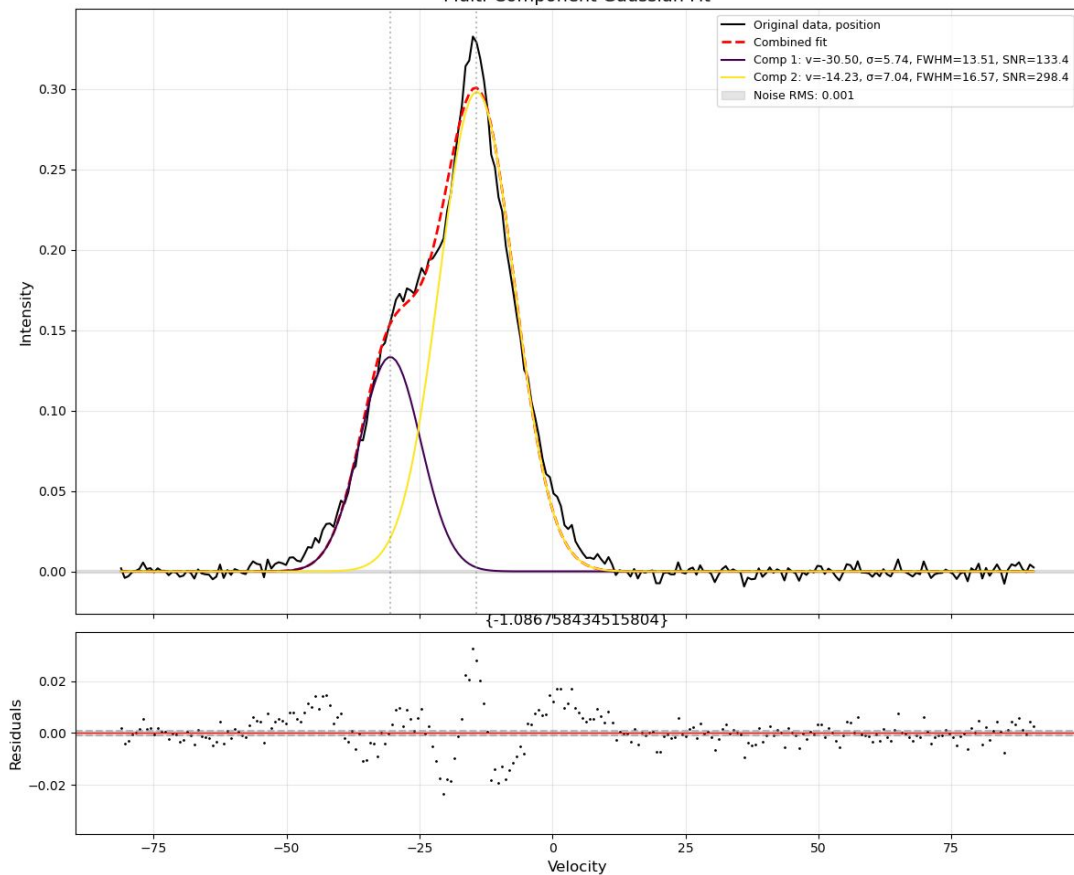
A dynamical center shifted due to Ram pressure?

2 Rotating components?

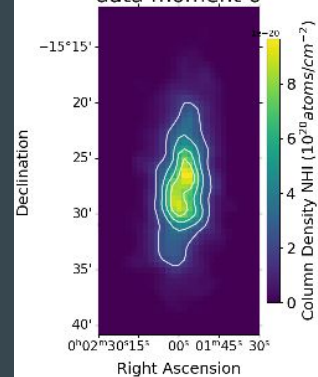




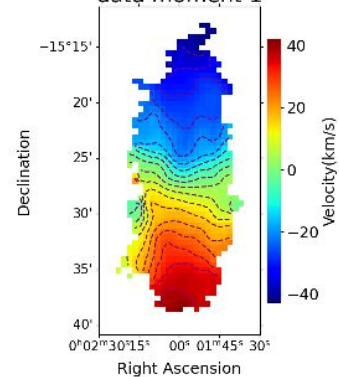
Multi-Component Gaussian Fit



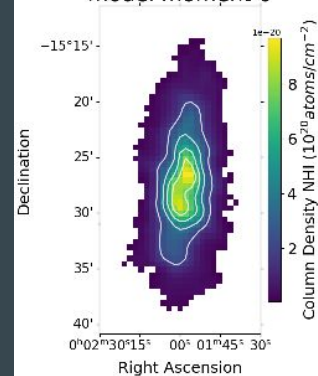
data moment 0



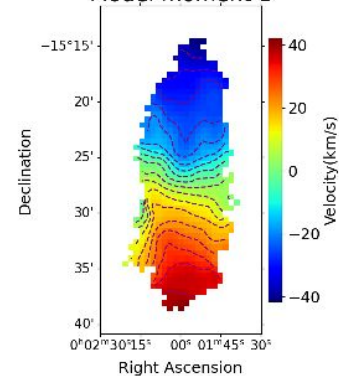
data moment 1

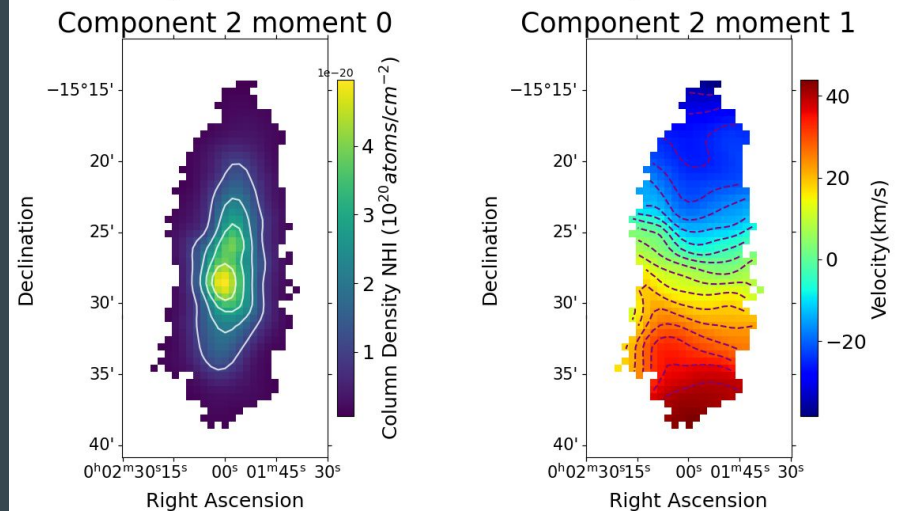
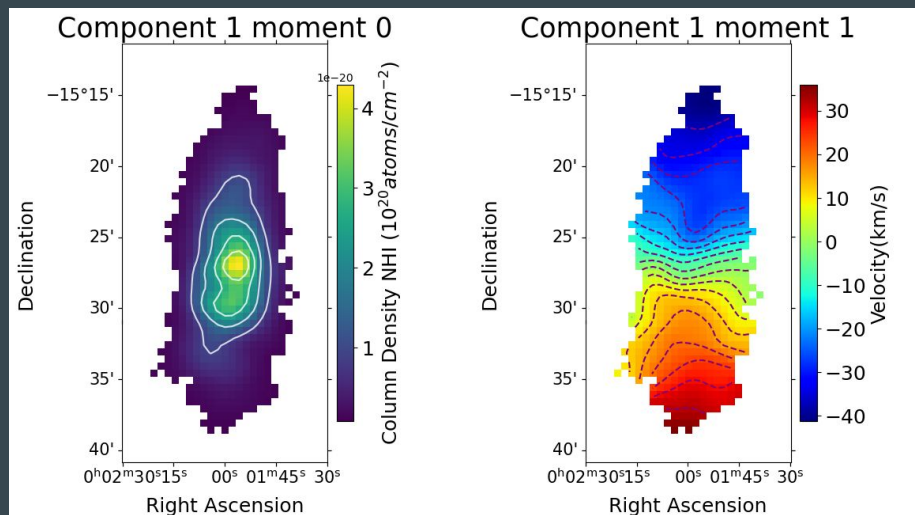
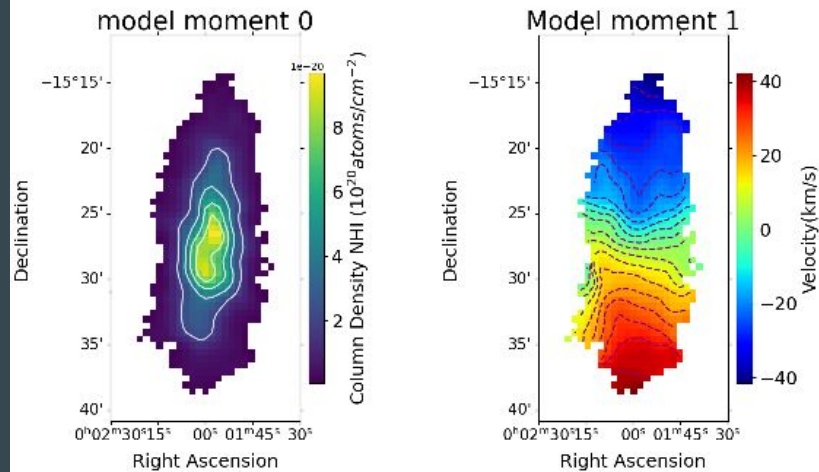
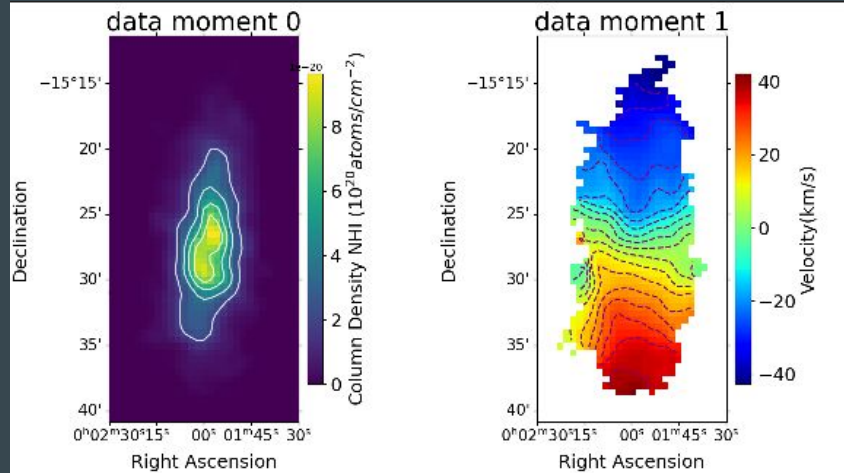


model moment 0

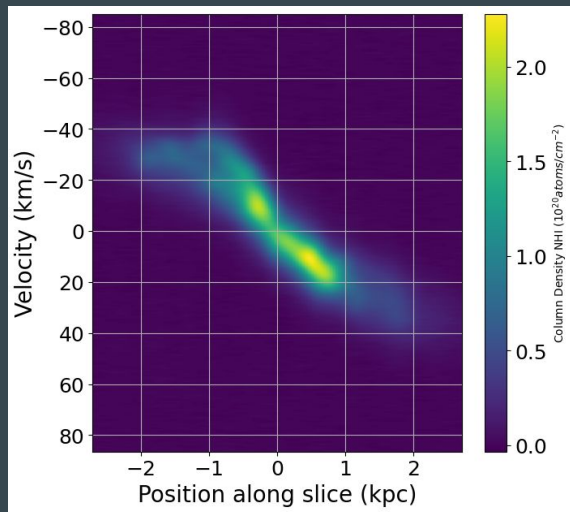


Model moment 1

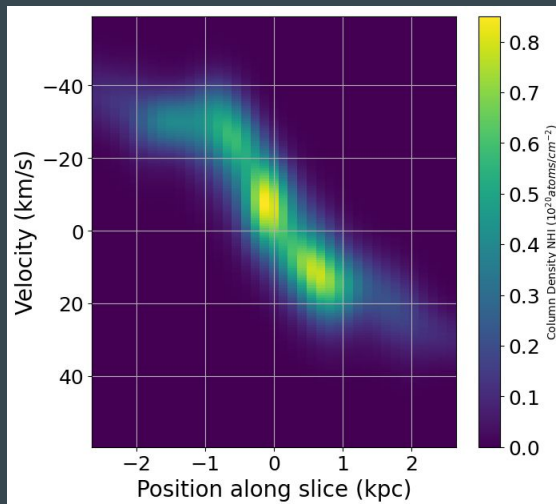




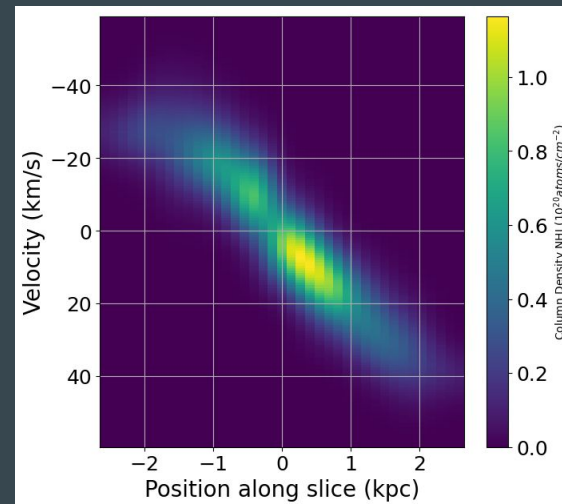
Unseparated PV diagram



Component 1



Component 2



Summary

- If the IGM can perturb gas disks of dwarfs, one must be careful with mass estimation
- There are 2 rotating gas components in WLM
- Solid body-like rotation of one of the components can explain the inner steep rise in WLM's rotation curve
- A Program for a close examination of gas rich dwarf dynamics is required, particularly with future radio observatories such as the SKA
- Hydrodynamical simulations can help understand IGM-gas disk interaction