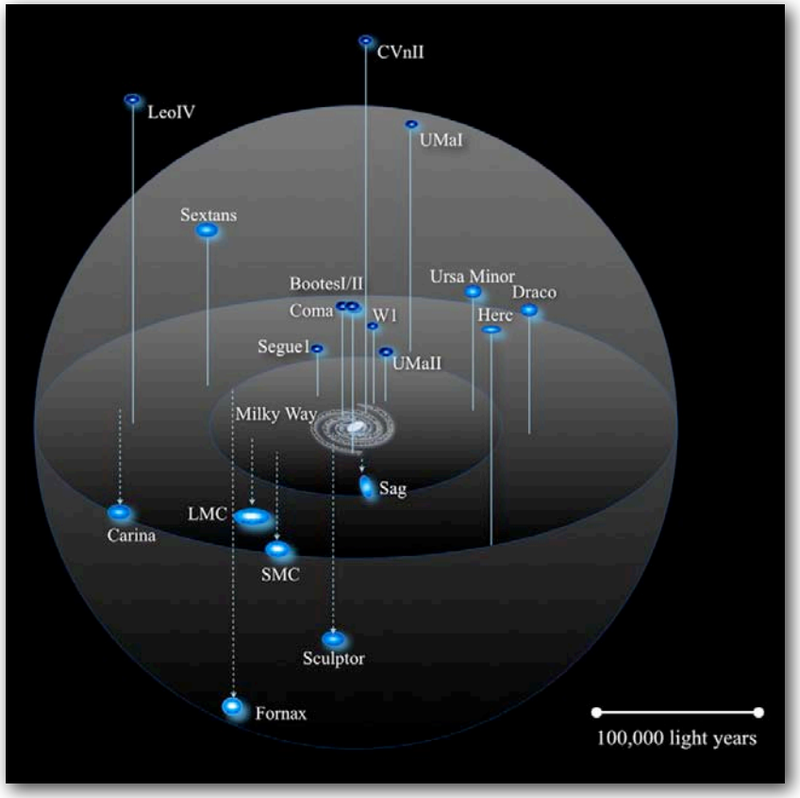
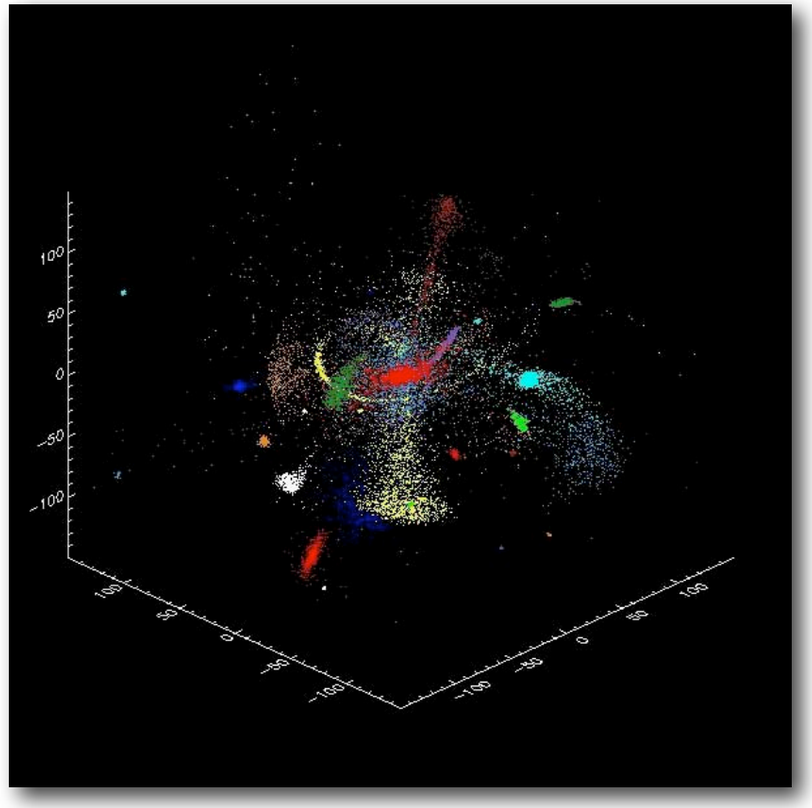
Outskirts of nearby galaxies/groups

Roelof de Jong (STScI -> AIP)

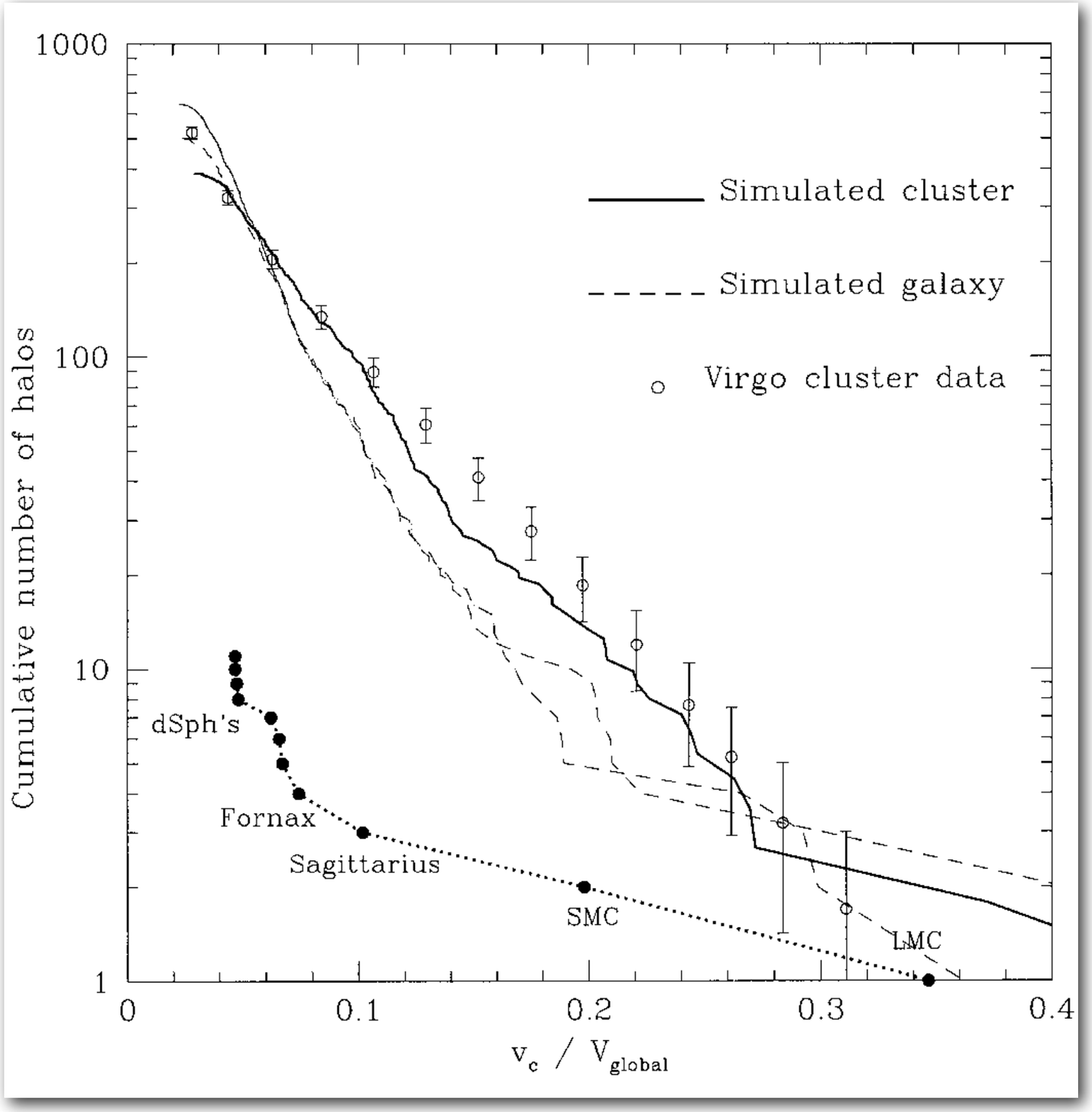
Hierarchical galaxy formation





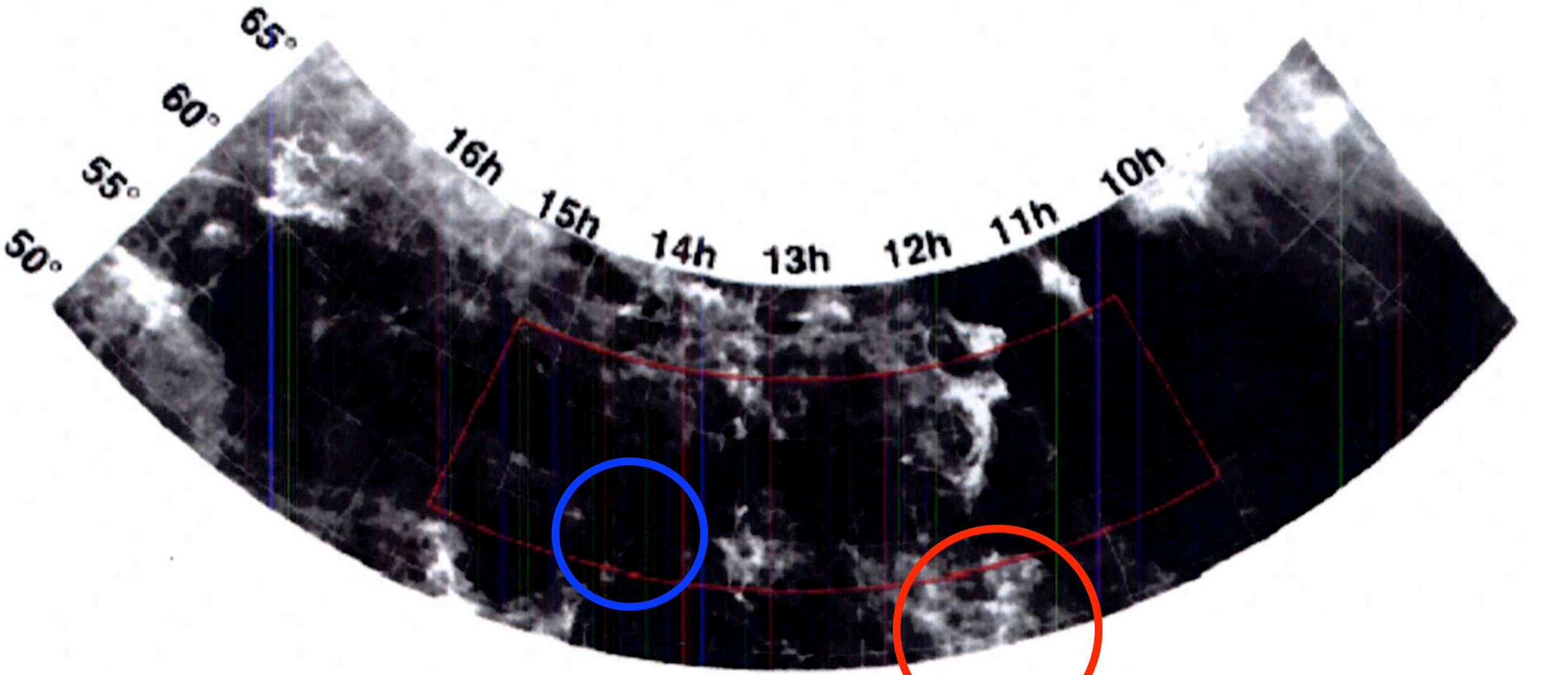
- How does the luminous matter map onto the dark matter halos on different mass scales
- What happens to luminous matter after interaction/merging

Missing satellites problem



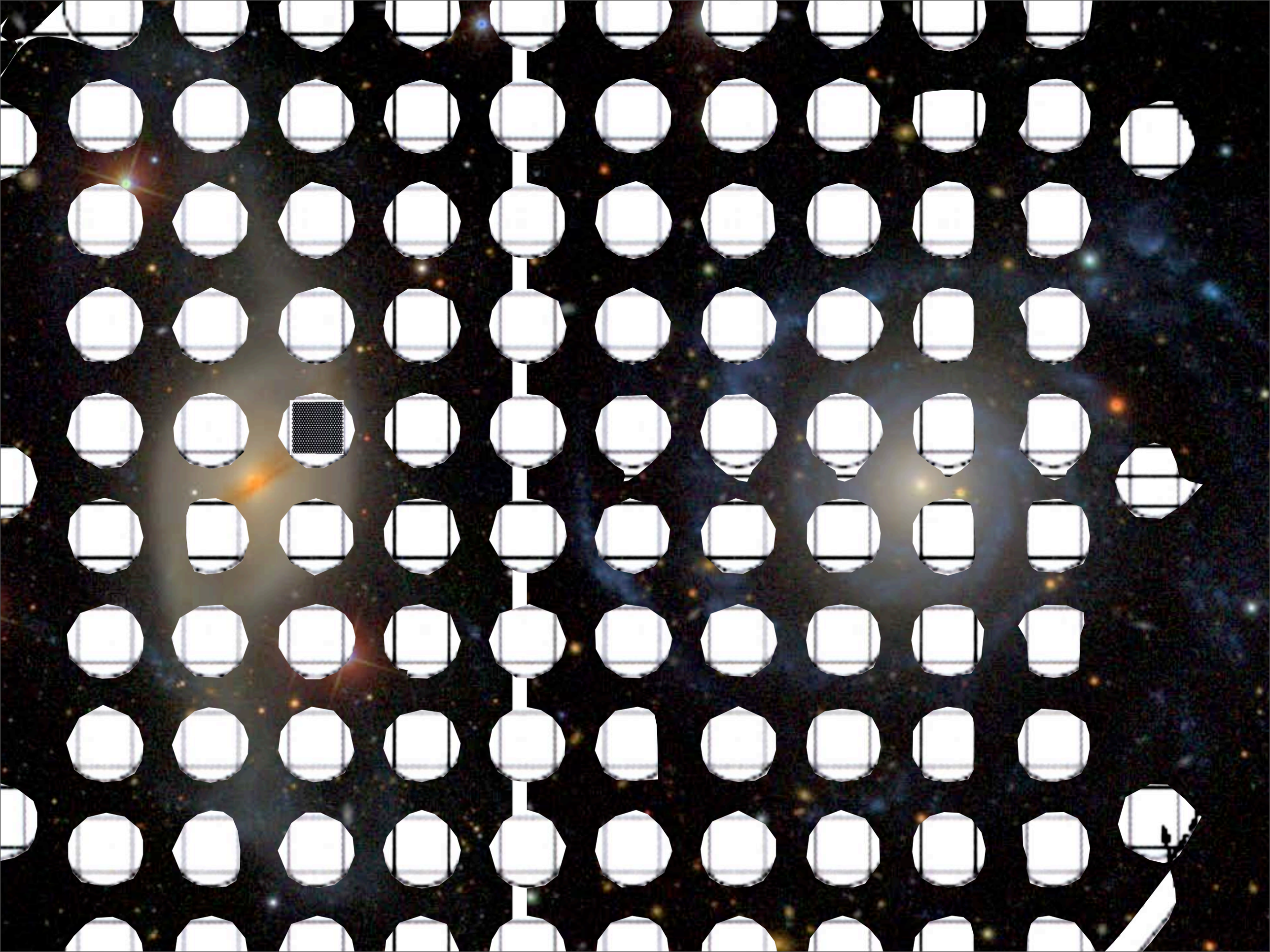
- Observationally only constraint by Local Group measurements
- Hard to measure for other galaxies, because for each dSph there are more than 50 background galaxies with similar size and apparent magnitude
- Redshift survey essential

Interesting nearby targets in survey area



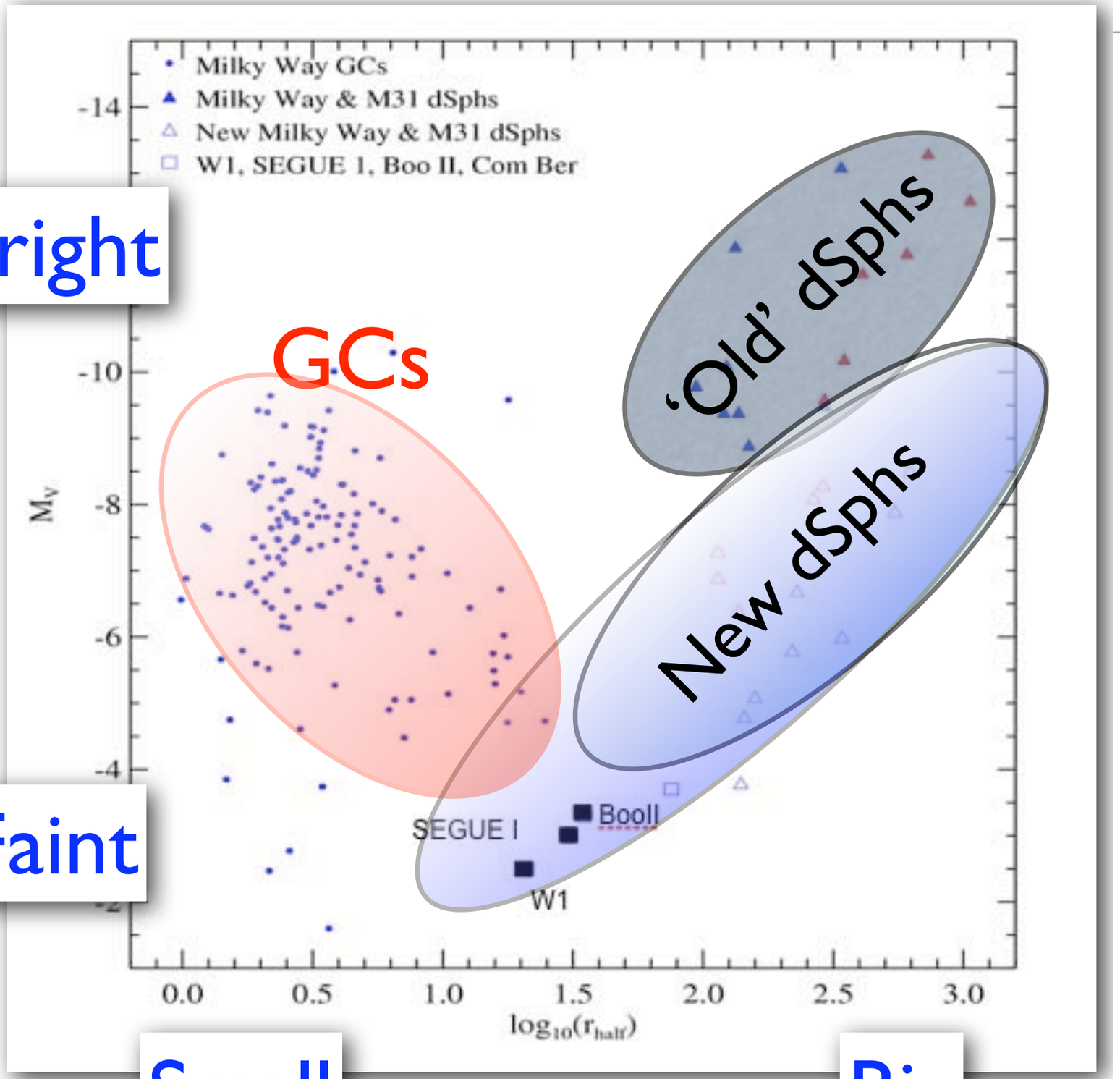
1Mpc around M101
D= ~7.5 Mpc

Ursa major cluster
D=~20 Mpc



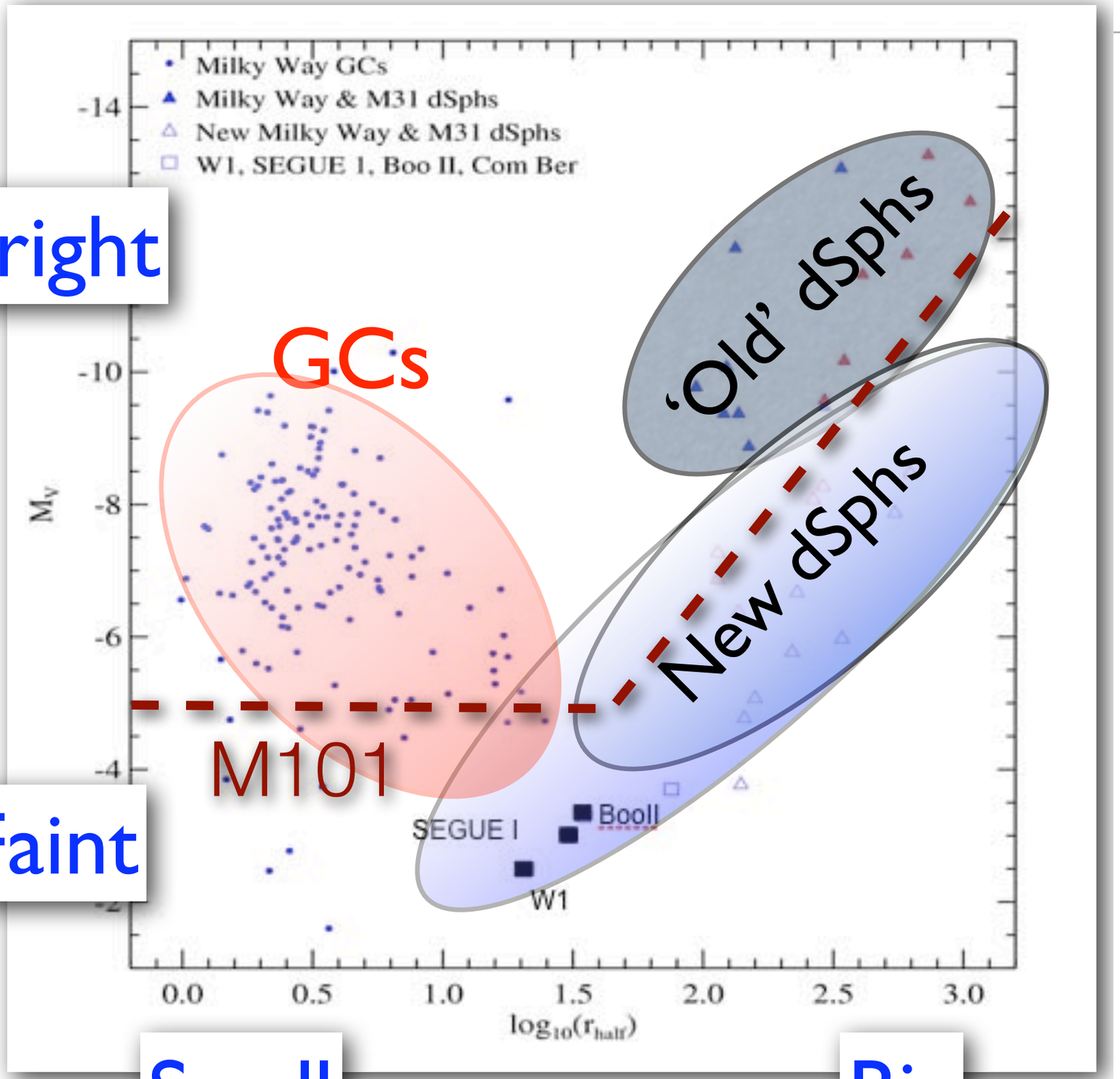
- Measurement of distribution of HI region metallicities in ~30 galaxies with D25>2.5 arcmin
- Trace star formation to very large radii
- Higher resolution mode would allow for measuring velocity field

Survey limits M101 and Ursa Major



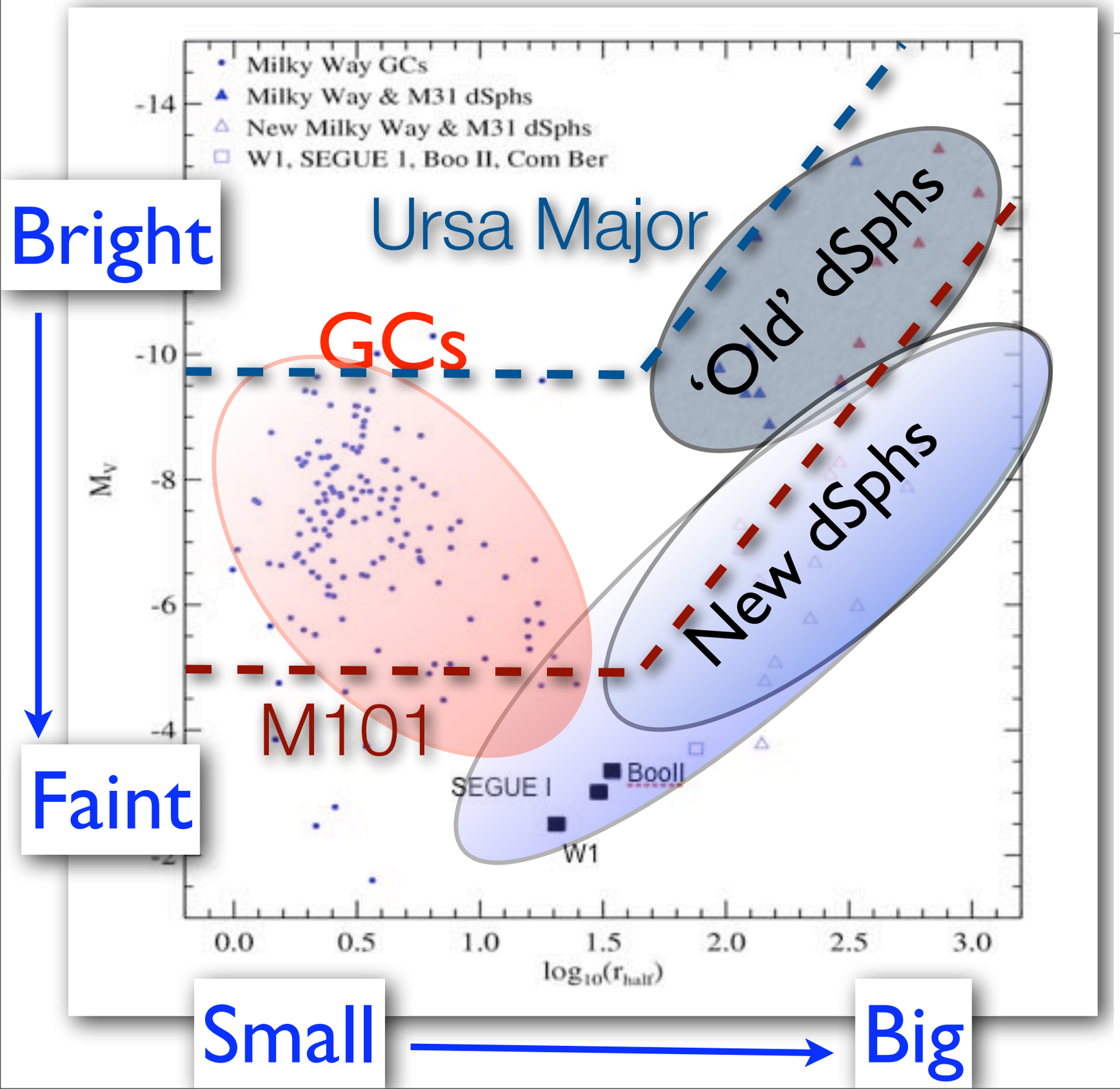
- Globular clusters only within reach for M101 and a few other nearby galaxies in survey area
- "Classical dSphs" maybe in reach for M101, but technique to combine fibers may even get some Ursa Major cluster in reach

Survey limits M101 and Ursa Major



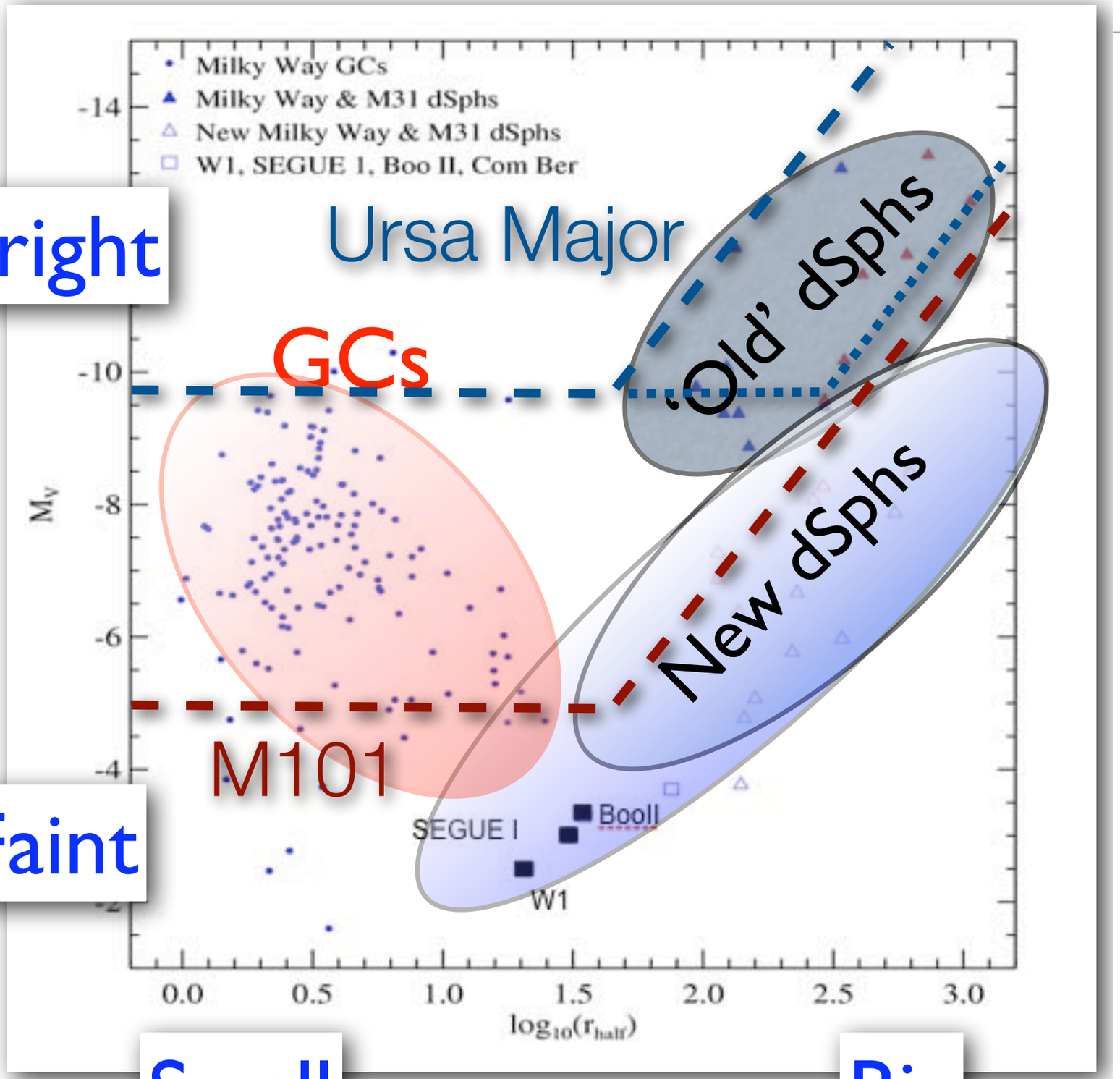
- Globular clusters only within reach for M101 and a few other nearby galaxies in survey area
- "Classical dSphs" maybe in reach for M101, but technique to combine fibers may even get some Ursa Major cluster in reach

Survey limits M101 and Ursa Major



- Globular clusters only within reach for M101 and a few other nearby galaxies in survey area
- "Classical dSphs" maybe in reach for M101, but technique to combine fibers may even get some Ursa Major cluster in reach

Survey limits M101 and Ursa Major



- Globular clusters only within reach for M101 and a few other nearby galaxies in survey area
- "Classical dSphs" maybe in reach for M101, but technique to combine fibers may even get some Ursa Major cluster in reach

Planetary Nebulae

- PNs have [OIII] 5007Å flux of ~20e-17 erg/s/cm^2 at the distance of M101, 2.5e-17 erg/s/cm^2 at the distance of Ursa Major
- Predicted sensitivity 5sigma is 3.5e-17 erg/s/cm^2
- Potential for mapping inter-galactic population in Ursa Major cluster using PN matched filter on spectra
- Implementing high resolution mode would enable kinematic mapping of nearby galaxies to large radii (Romanowsky et al. controversy)

Summary

- We can make complete measurements of GC systems around a few nearby galaxies in survey area.
- Planetary nebulae can be detected to Ursa Major cluster distances. Potential for finding inter-galactic stellar population. Also precursor for kinematic followup measurements.
- dSph population mostly out of reach, unless we can stack spectra of adjacent fibers.
- High resolution mode would allow immediate kinematic mapping of large angular diameter galaxies like with HI, but at much better spatial resolution. PN would provide constraints to very large radii.