

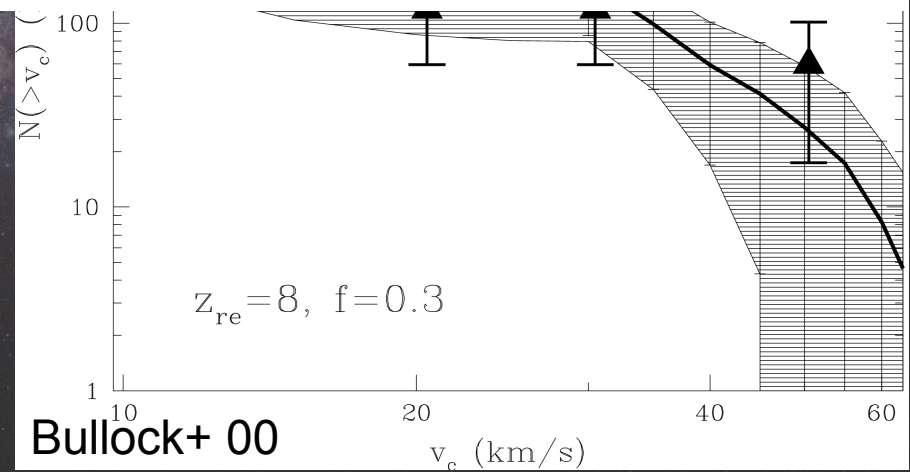
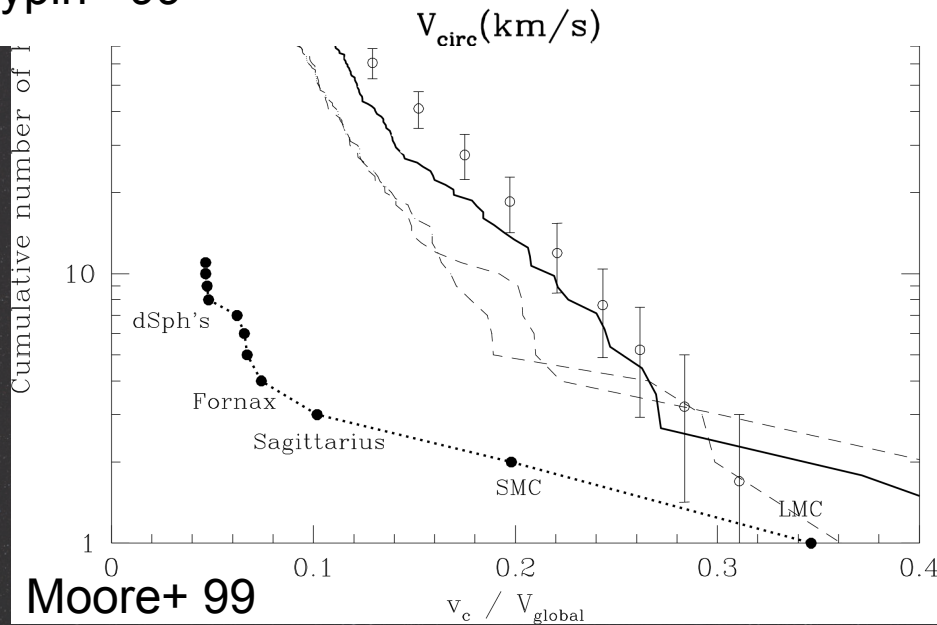
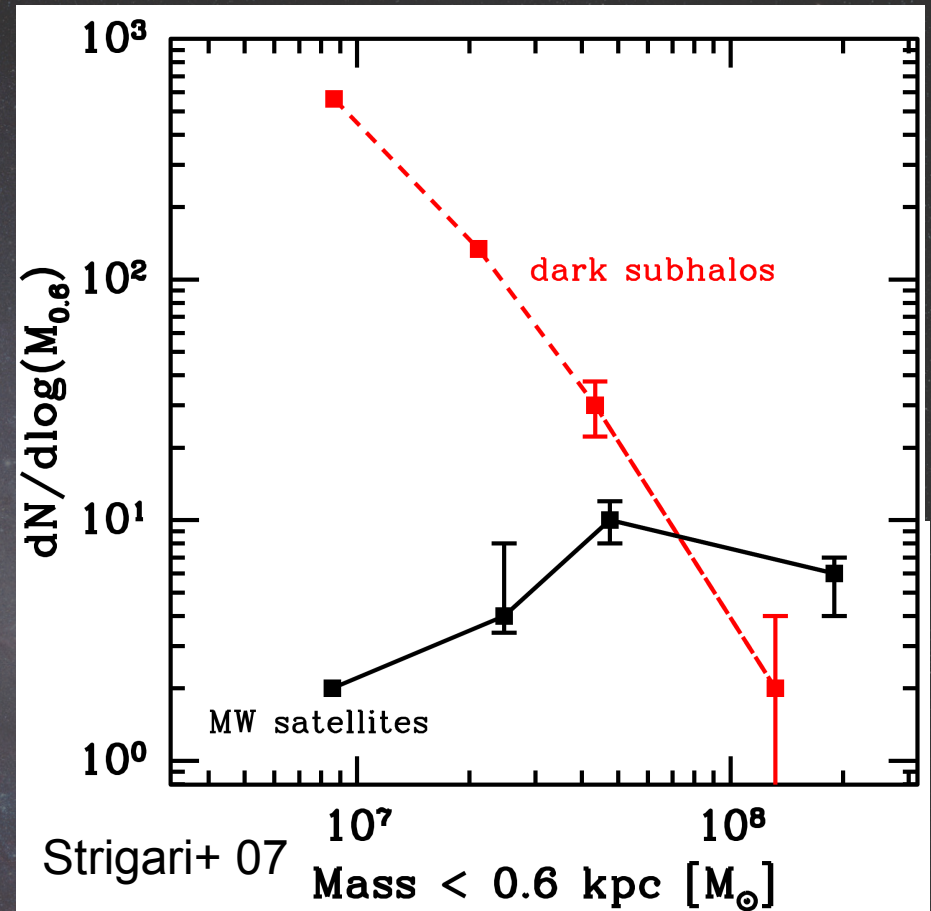
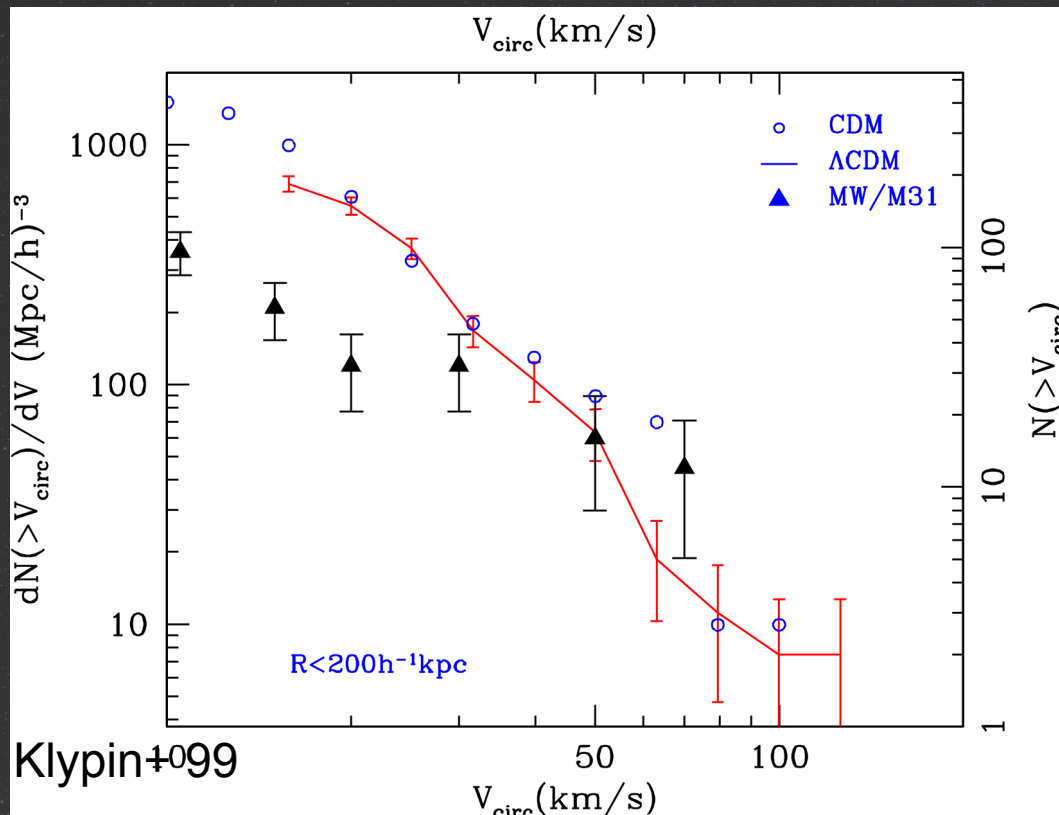
LMCs in the SDSS and LCDM: A "Found" Satellites Problem?

Erik Tollerud

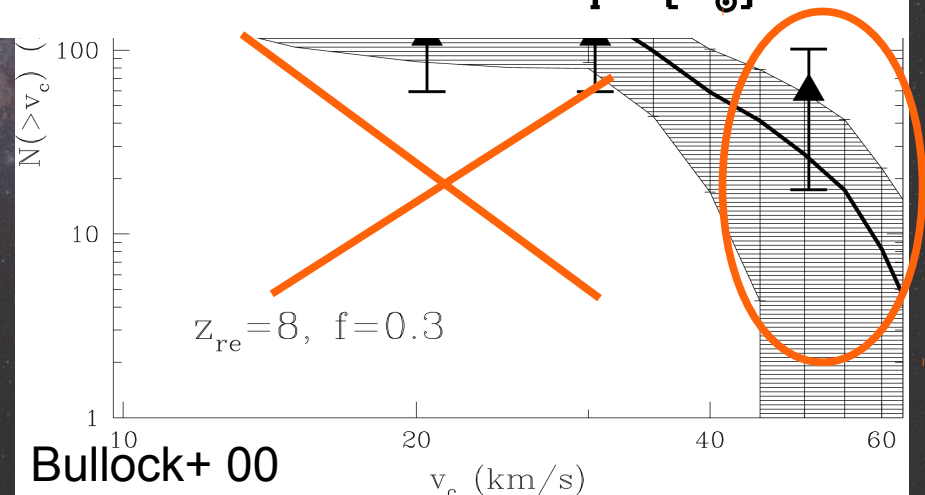
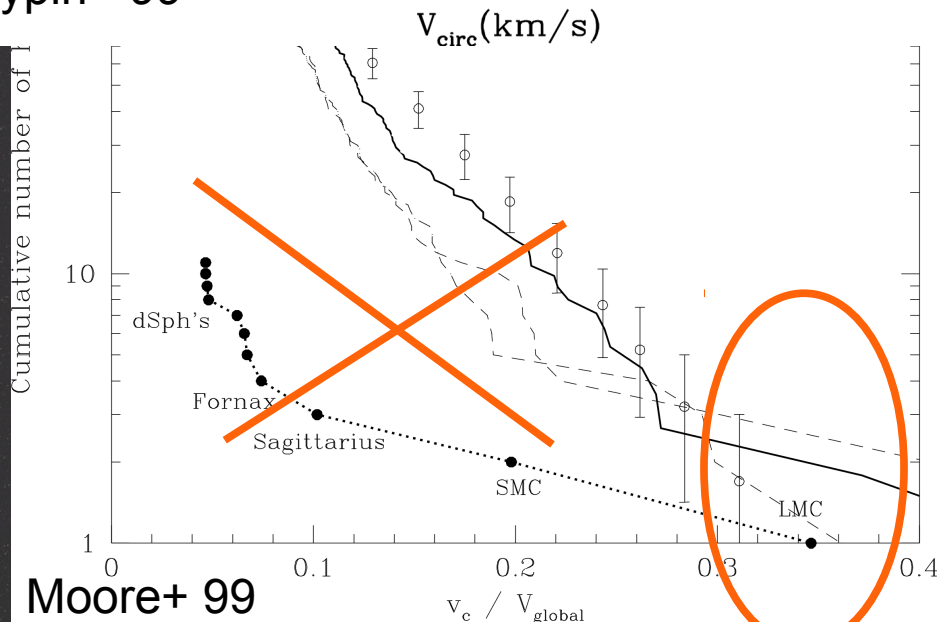
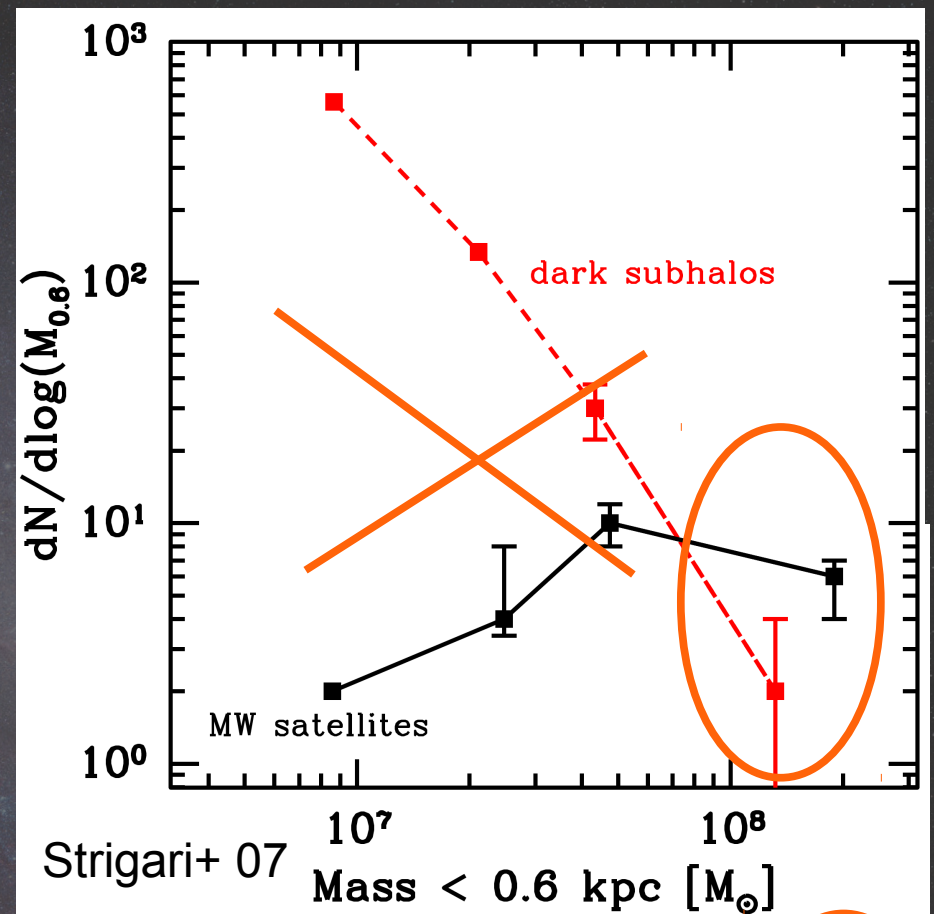
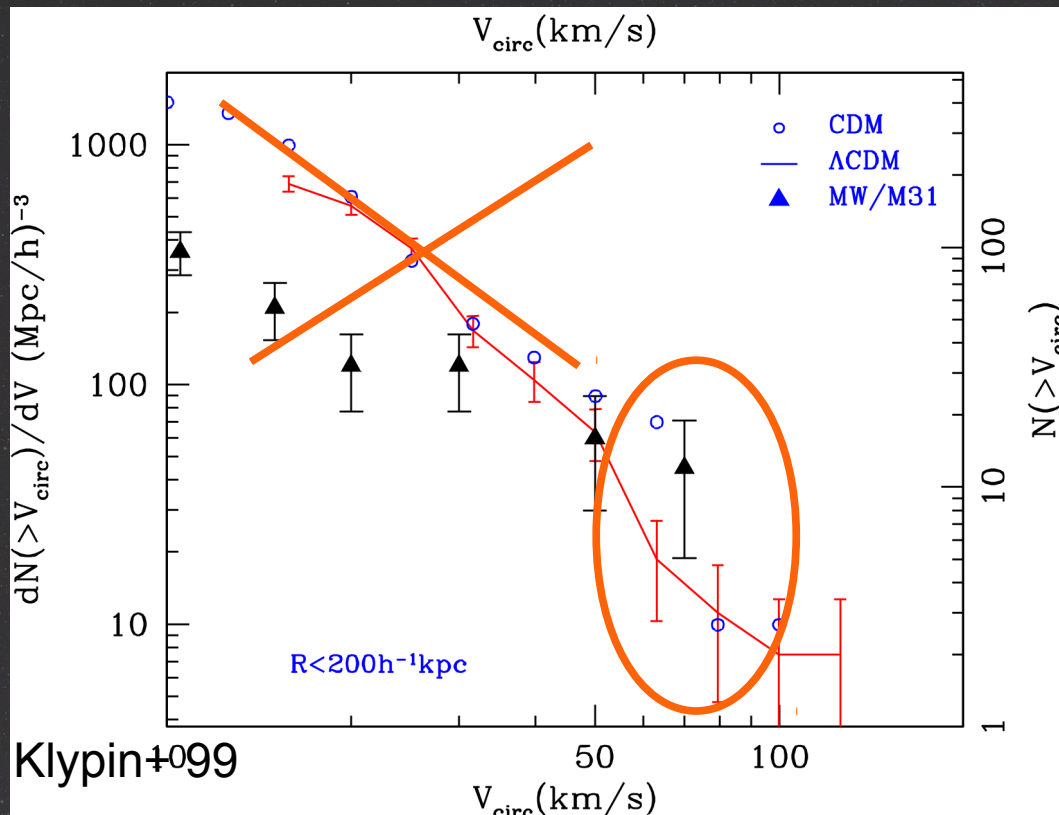
(Team) UC Irvine

Betsy Barton (Irvine), James Bullock (Irvine),
Michael Boylan-Kolchin (MPIA), Chris Trinh (Irvine/Sydney)

Motivation

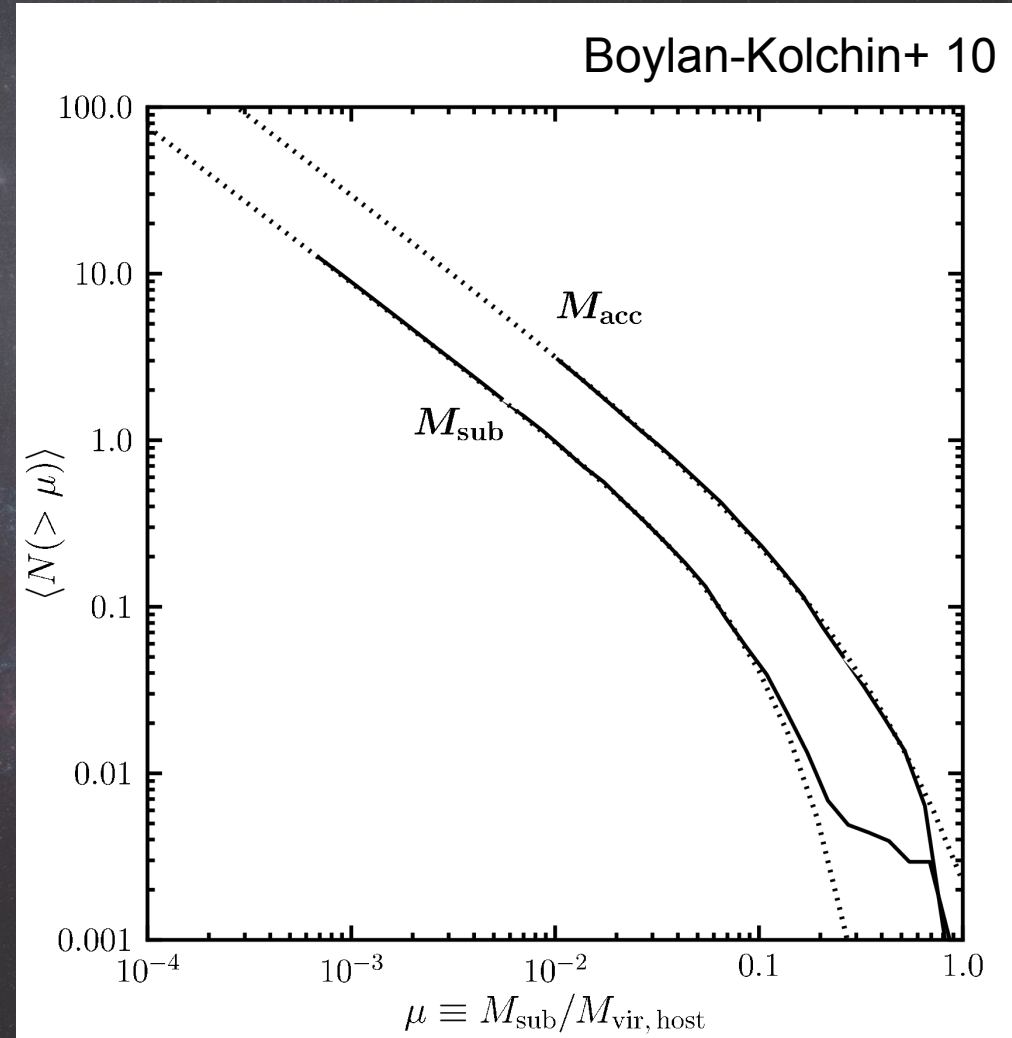


Motivation



LMC \leftrightarrow LCDM

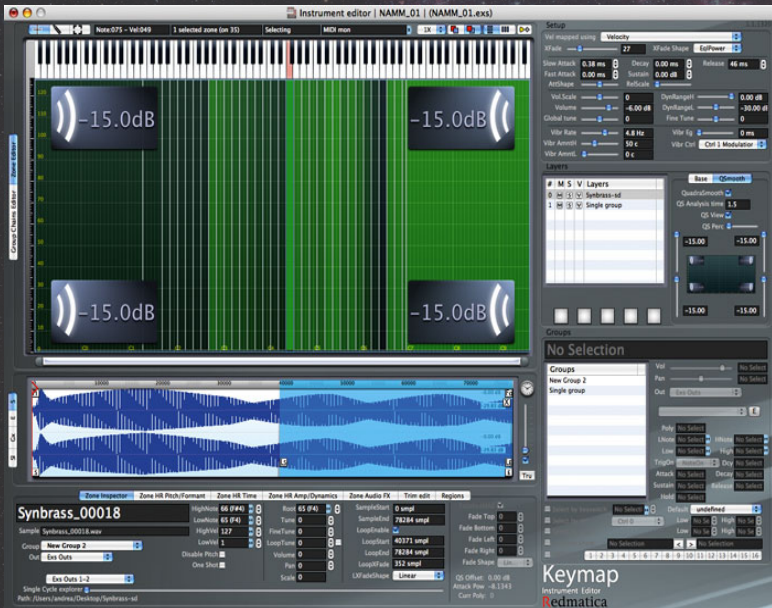
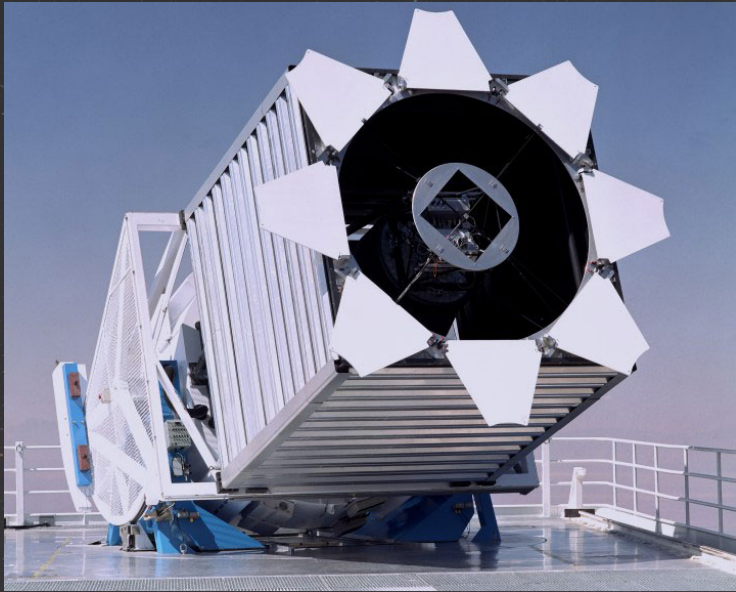
- LMC (analogs) \rightarrow LCDM
 - Boylan-Kolchin+ 10
4-20% of $\sim L_*$ hosts
have LMCs
 - "Found Satellite
Problem"?



LMC \leftrightarrow LCDM

- LMC (analogs) \rightarrow LCDM
 - Boylan-Kolchin+ 10 : 4-20% of $\sim L_*$ hosts have MCs
 - "Found Satellite Problem"?
- LCDM \rightarrow LMC
 - Is the LMC, specifically, weird?

Method



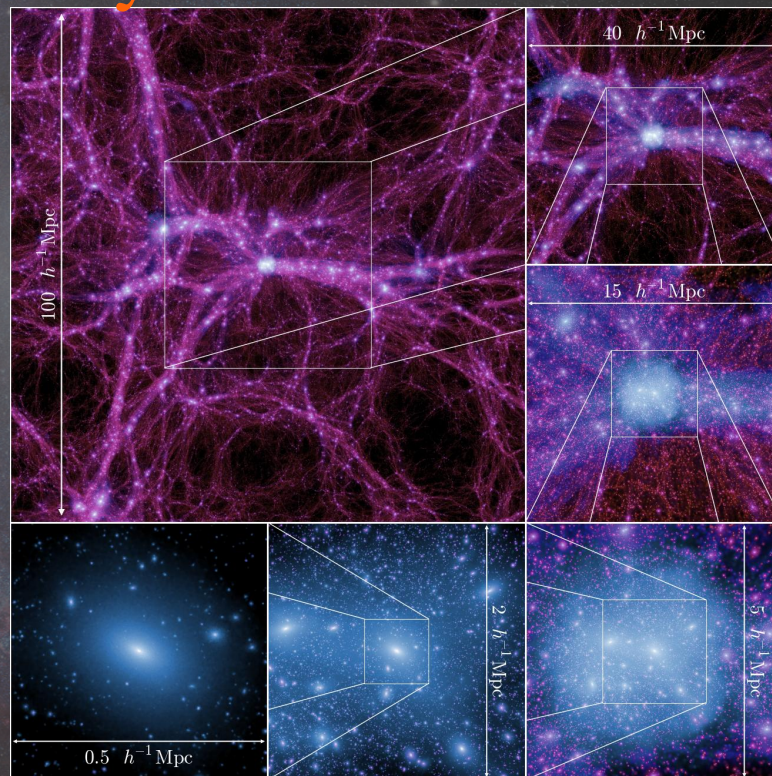
UCSC GFW '10 Intro → SDSS Sample → Simulations → Results → Conclusions

SDSS Sample

- NYU VAGC (Blanton+ 05) DR7 (spectroscopic)
- Volume-Limited to SDSS spec limit for faintest satellites ($z < .034$)
- Hosts $r_{h=1} < -20$, Sats $-17.5 > r_{h=1} > -20$
- Isolated/low-density hosts
 - Nearest host > 250 kpc/h
 - $N_{\text{host}} \leq 1$ within 700 kpc/h
- Nearest sat with $\Delta v < 500$ km/s

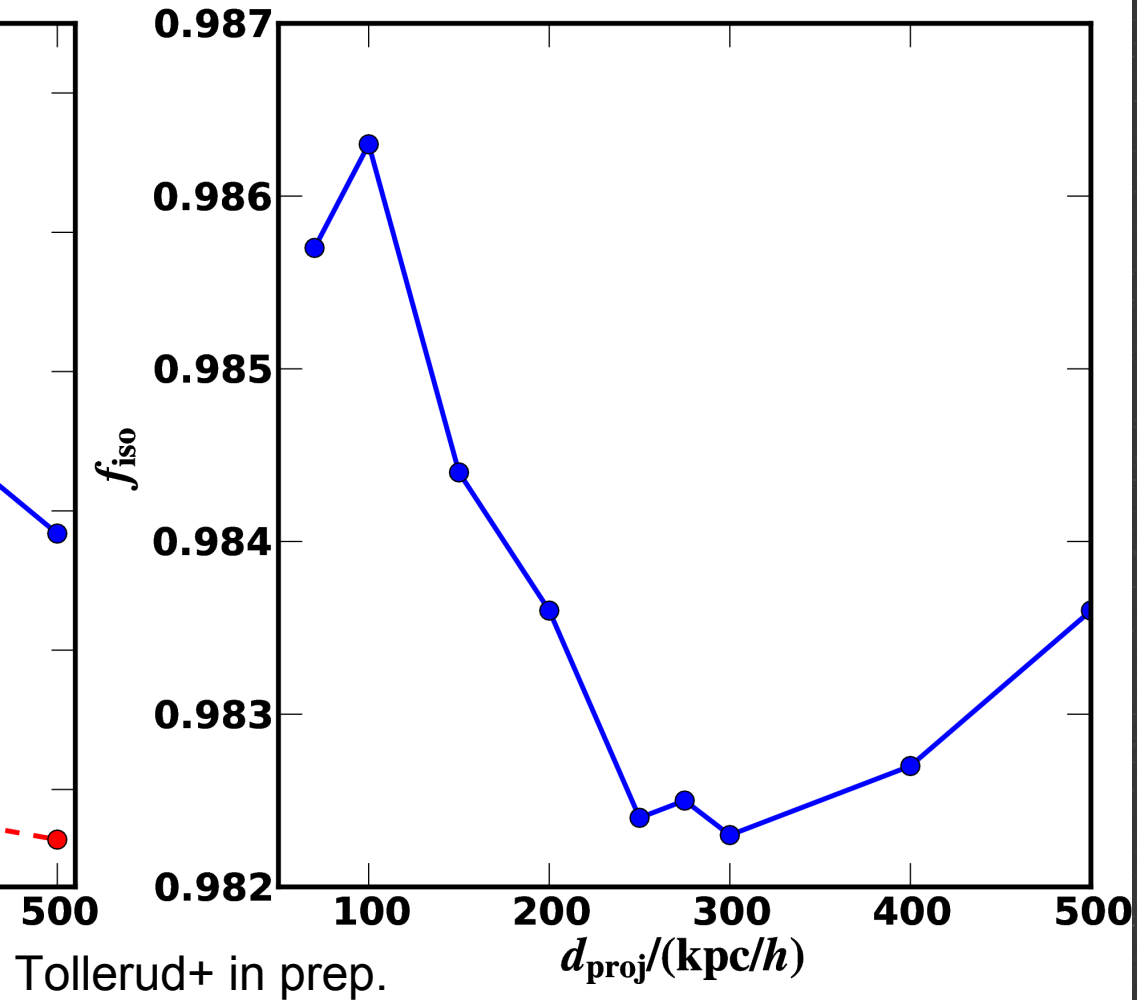
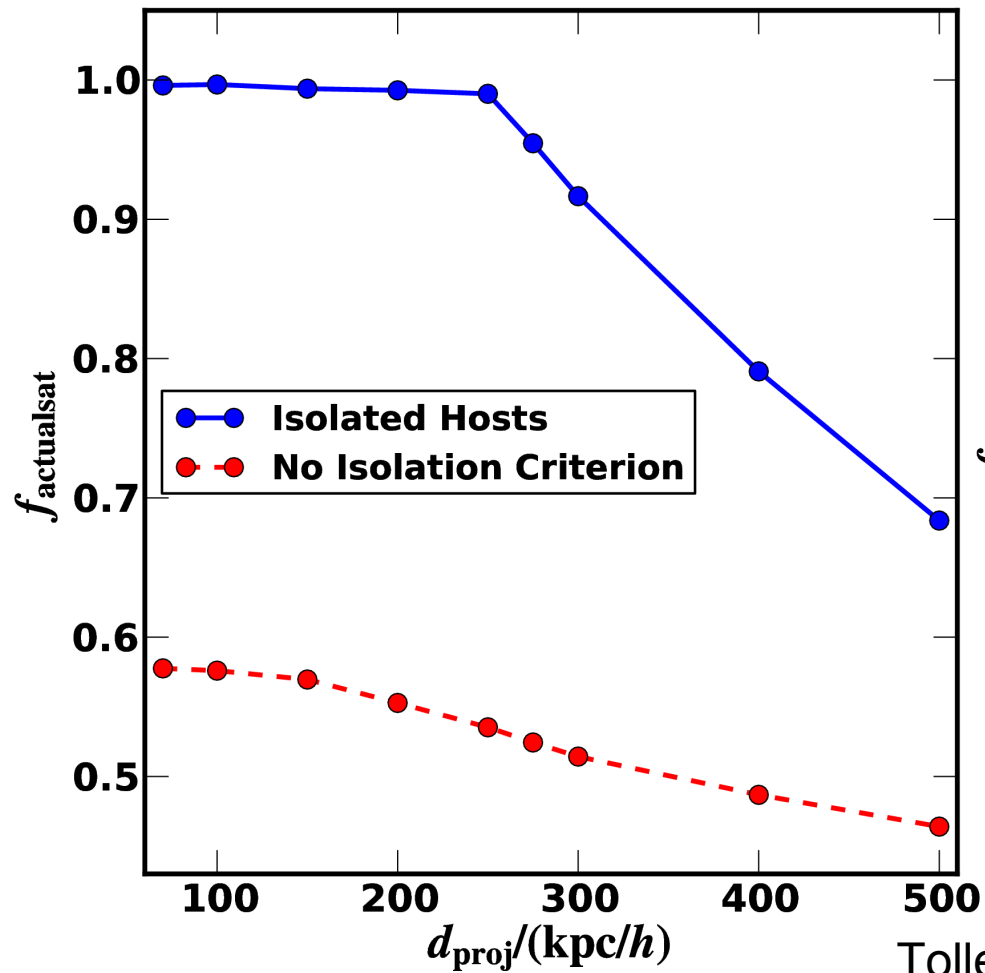
Simulations

- Hybrid Model
- Berrier+ 2006: N-body host halos
- Zentner+ 2005 SAM: Subhalos/satellites
- Millenium II
- Boylan-Kolchin+ 2010



- "Observe" simulations (e.g. Barton+ 07) w/ SDSS criteria
 - Abundance matching for halo mass cuts

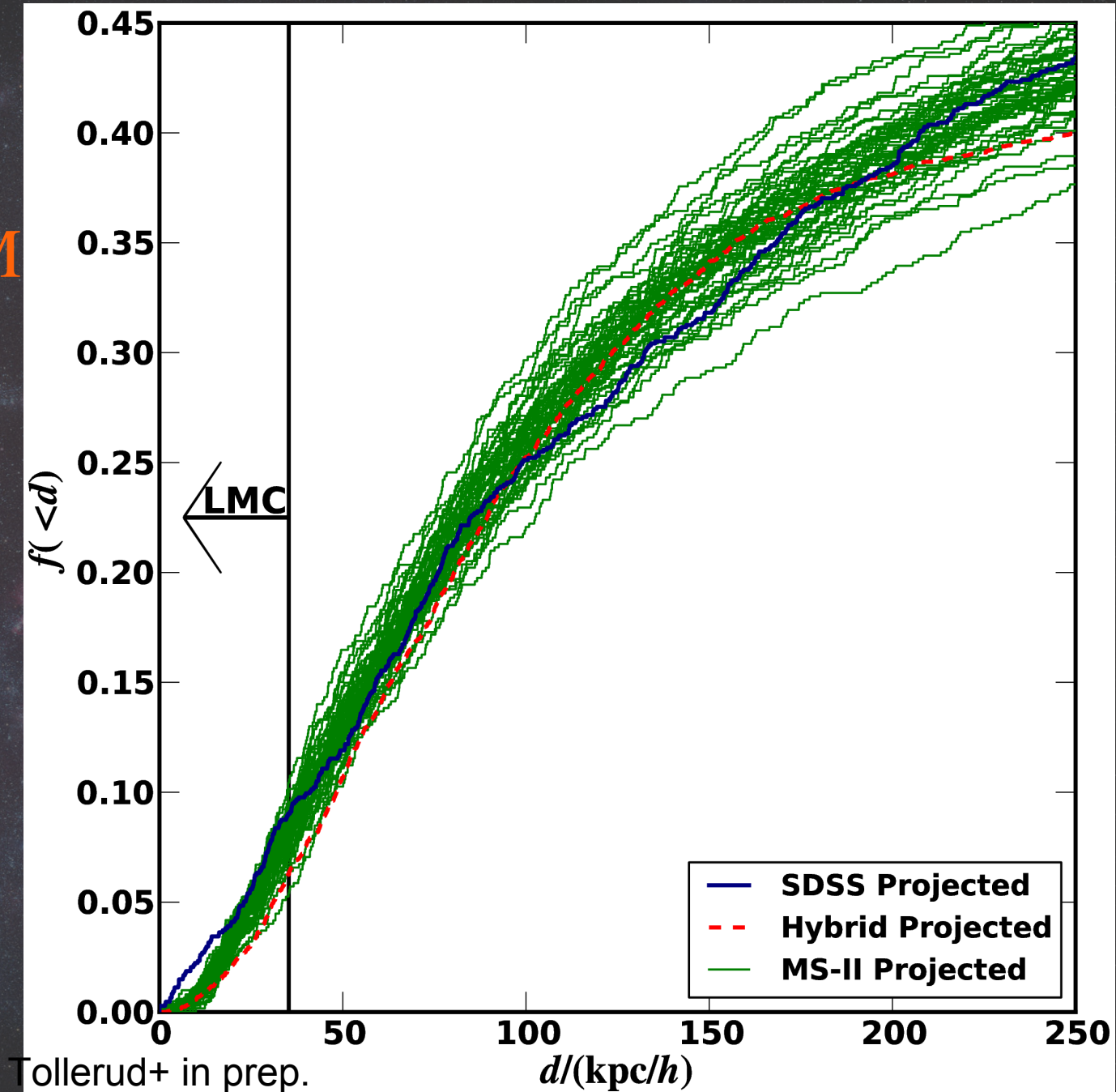
Sample Validation



Tollerud+ in prep.

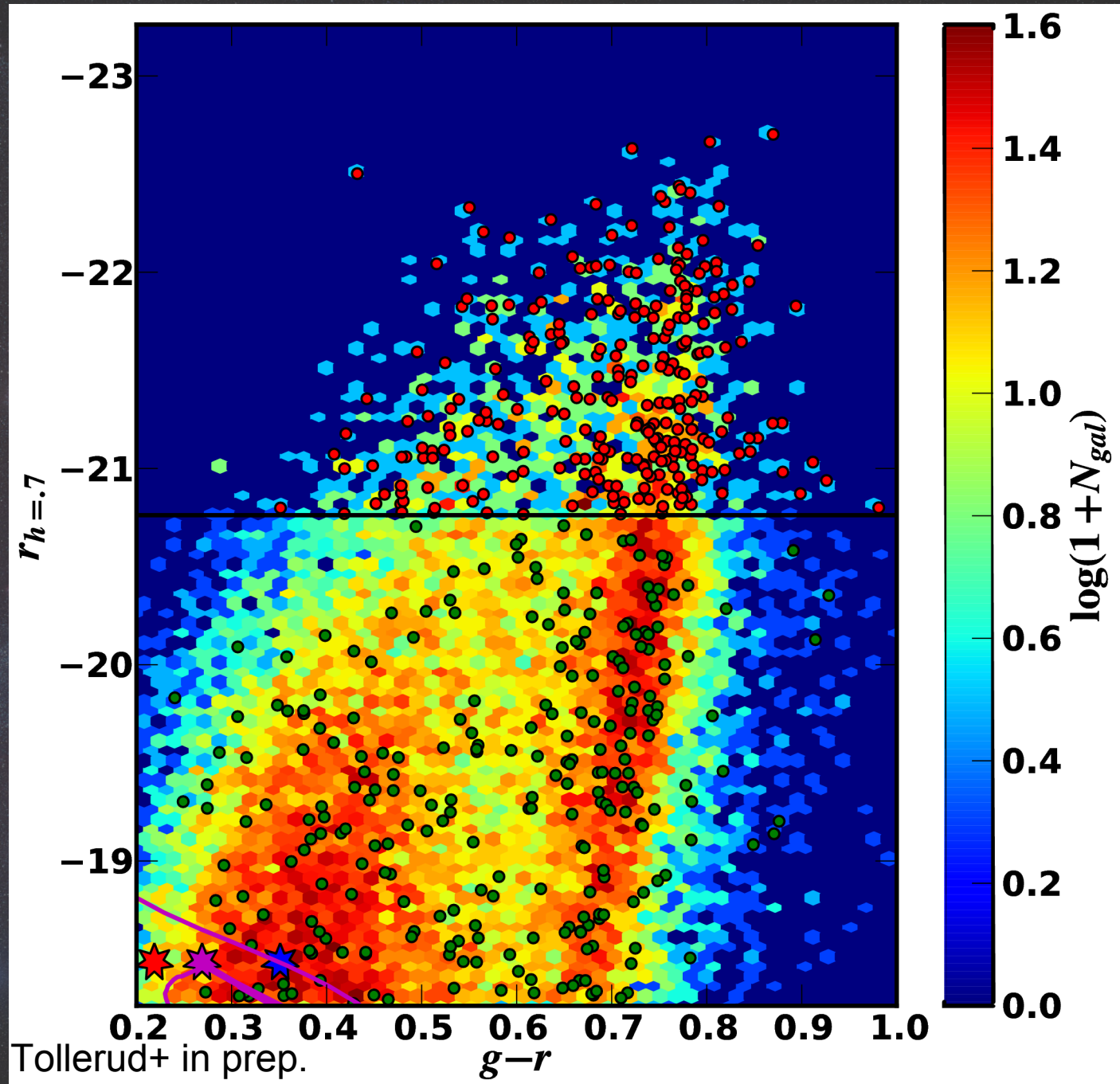
Separation Distribution

- SDSS sample matches LCDM prediction
- LMCs ~ 10%



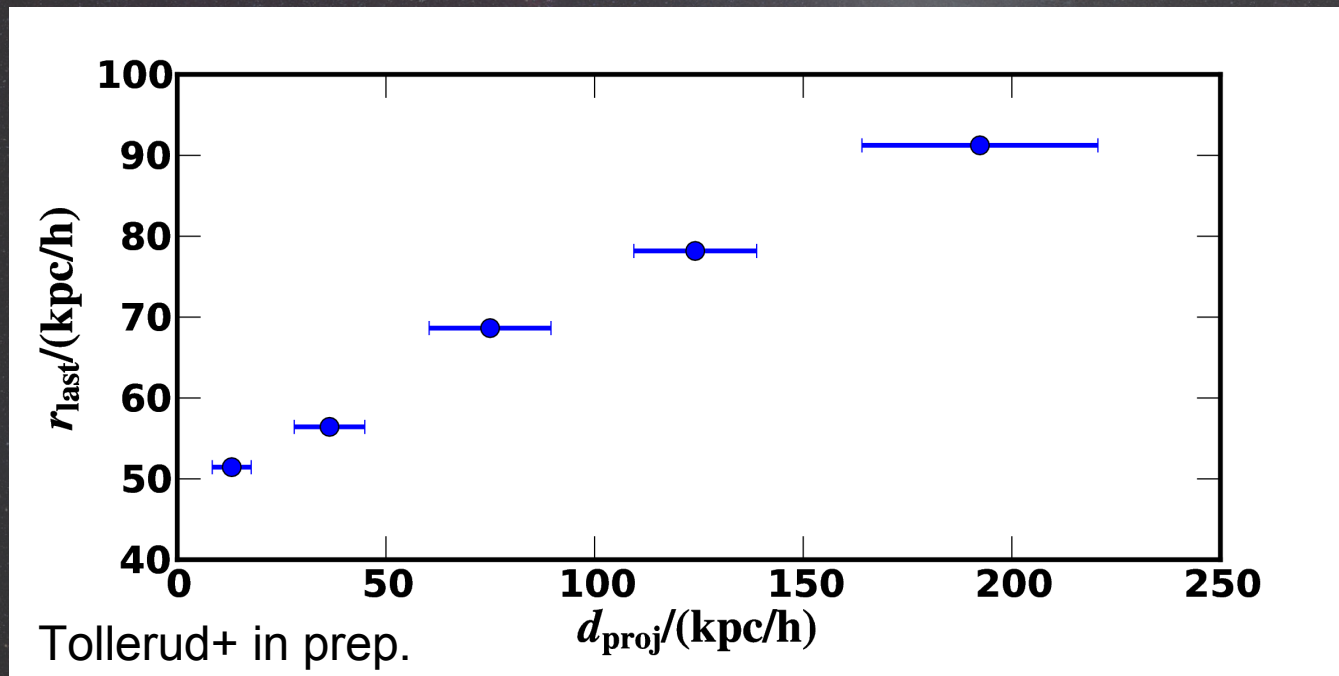
CMD

- Hosts
- Satellites
- Density: Possible Host/Sat
- LMC Colors:
 - RC3
 - SSP+SFH (Zaritsky private comm.)
 - Bothun '88



The Blue LMC

- First Infall?
 - PMs: Kallivayalil+ 06, Piatek+ 08
 - Implies quiescent MW: Hammer+ 07, Stewart+ 08
Purcell+ 09, Shen+ 10
- Can test this with simulation orbital histories.



Summary

- LCDM matches LMC-like satellites: No Found Satellites Problem!
- MW/LMC pairing not terribly unusual in luminosity.
- LMC is remarkably blue.
 - First Infall?
- Stay tuned for detailed SDSS sats to subhalo comparison...



Backup Slides

Fiber Collision

