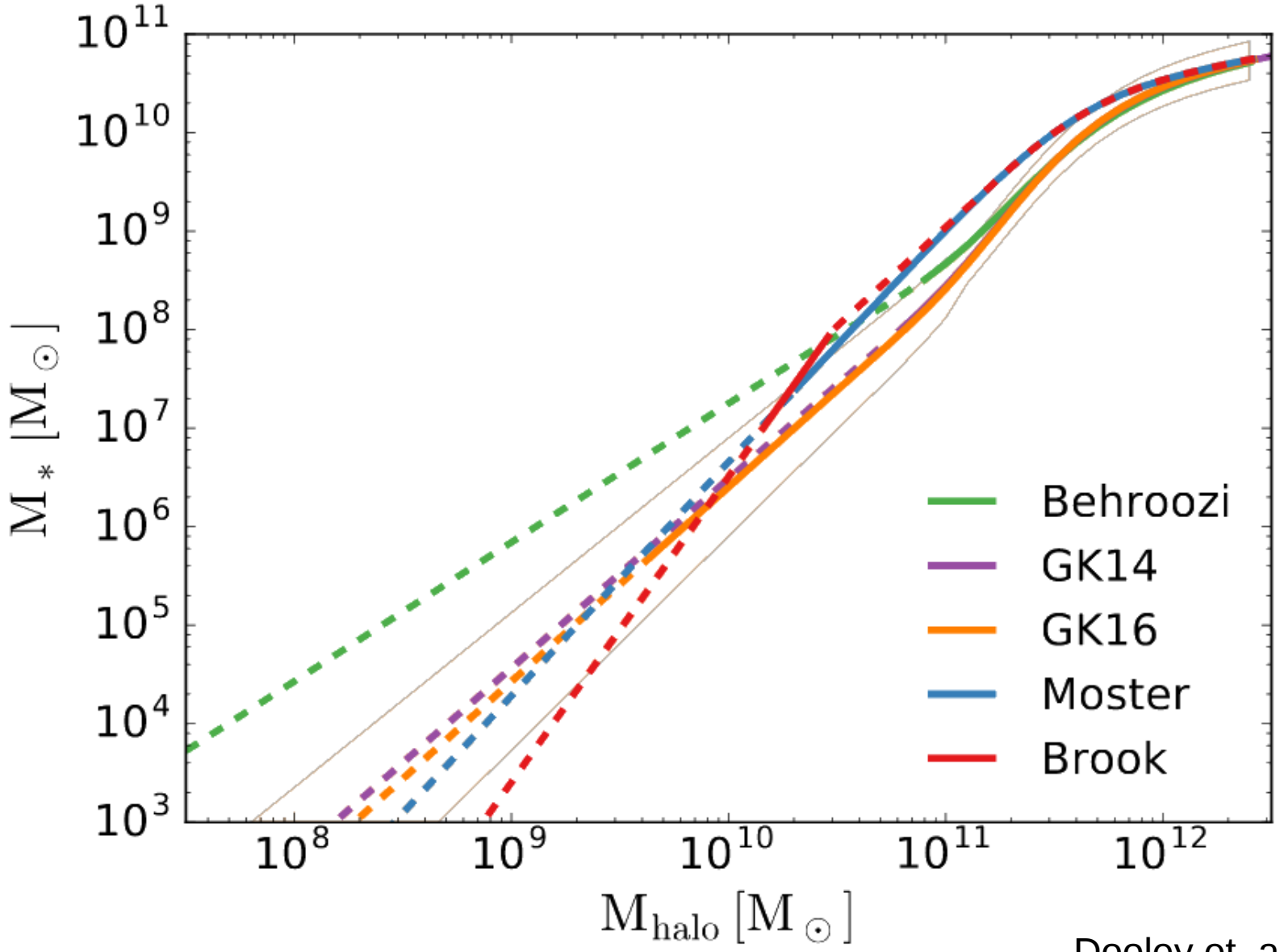
Dwarf Galaxy Population of a Nearby Star-Forming Galaxy and Implications for Dark Matter

A. Bianca Davis, Anna Nierenberg, Annika Peter, Christopher Kochanek

The Ohio State University

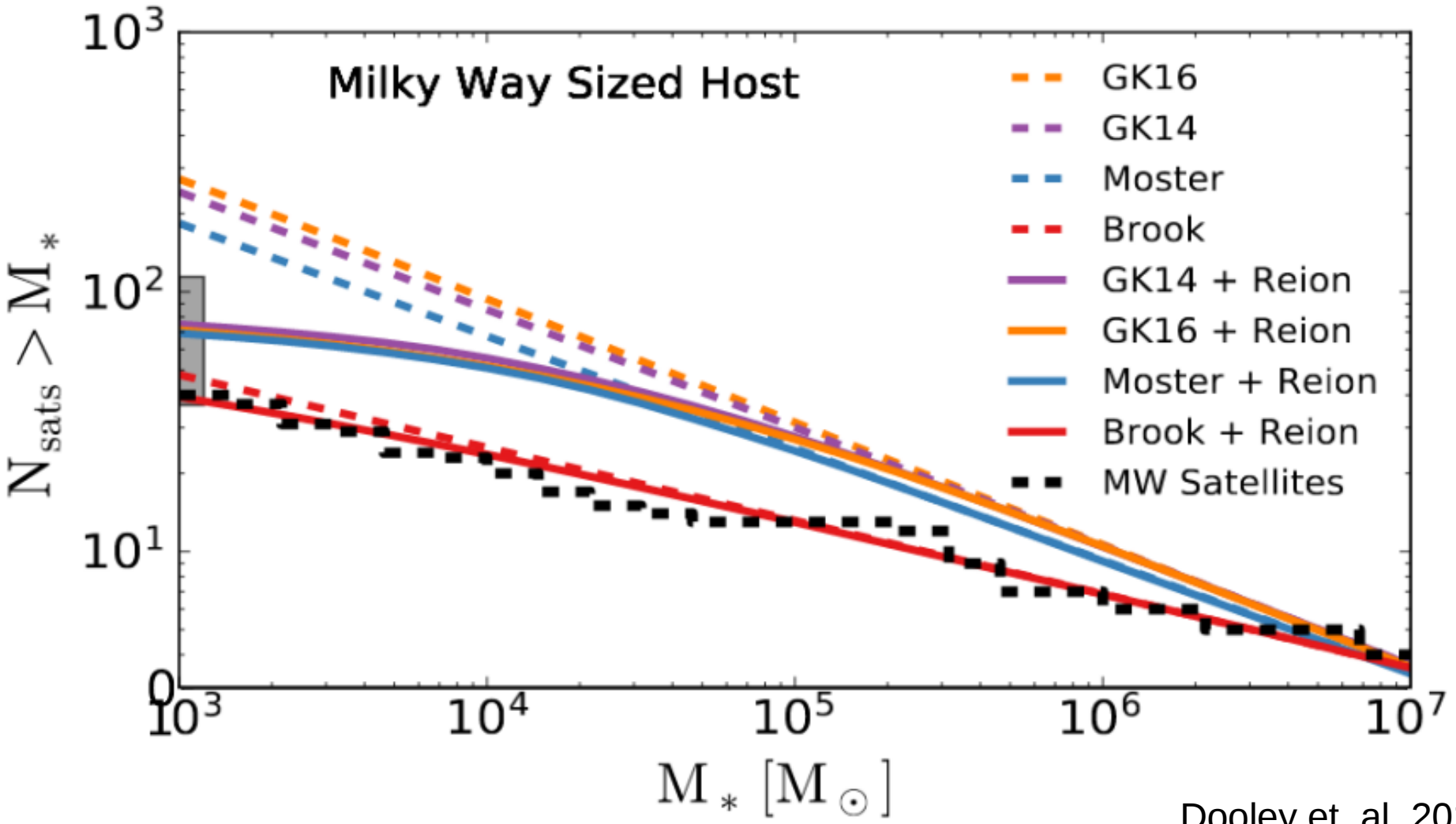
Image credit: NASA, ESA, and T. Brown and J. Tumlinson (STScI).

Stellar Mass to DM Halo Mass Relationship



Dooley et. al. 2017

What We See



Dooley et. al. 2017

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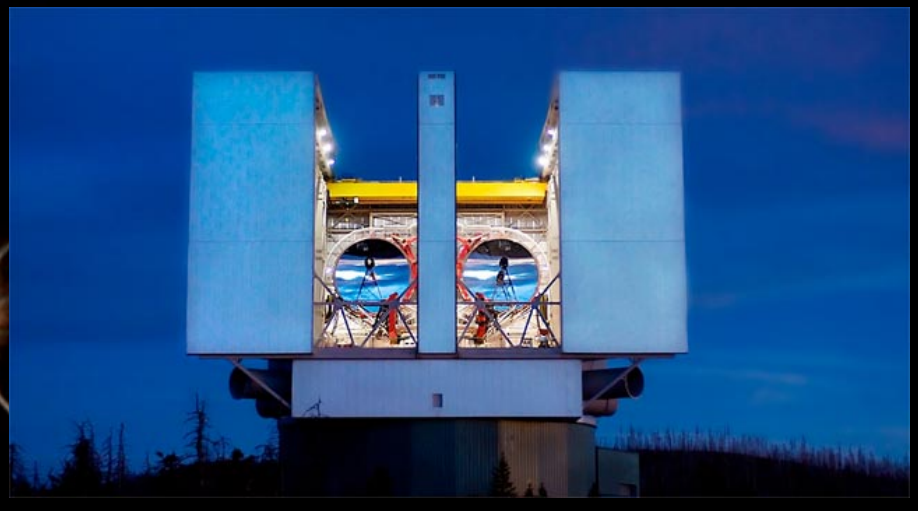
We need more systems!

Our Survey

- “Search for Failed Supernovae with the LBT” dataset, Kochanek 2008
- 27 star-forming galaxies within 10 Mpc
- Range in luminosity from LMC to MW size
- R band magnitude limits fainter than 26 mag
- Probing 1% to 20% of virial volumes



N628/M74

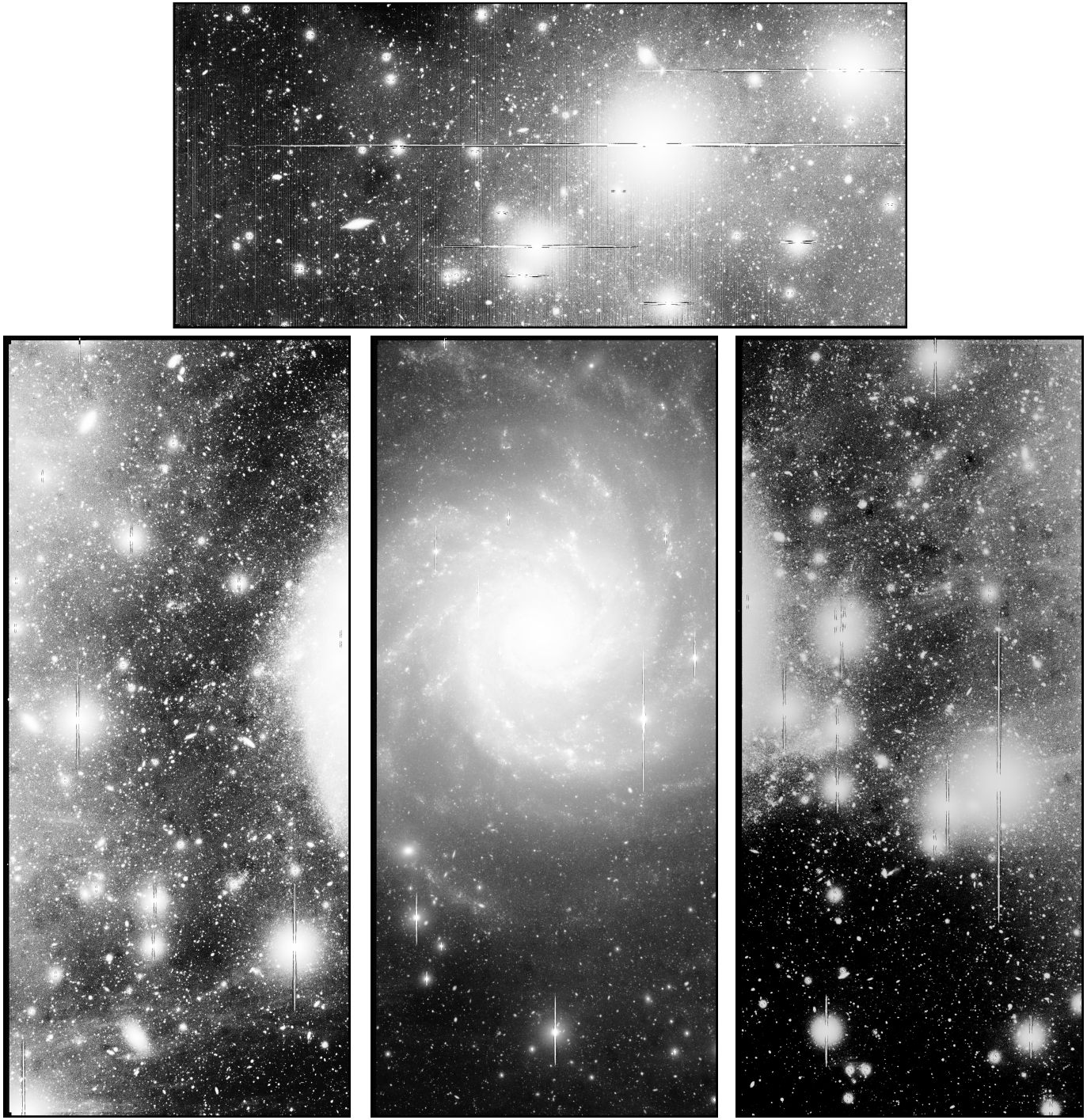
$M_* \approx 1.3 \times 10^{10}\,\mathrm{M}_\odot$

~1/4 the stellar mass of the Milky Way

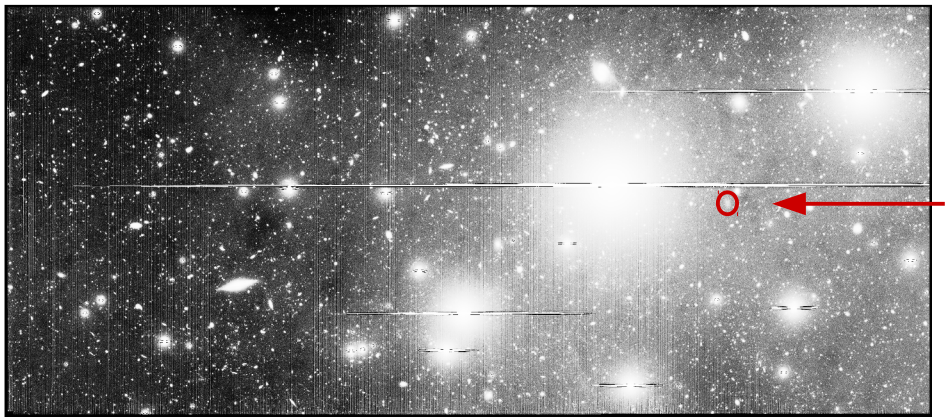
At 10 Mpc – farther and one of largest virial volumes we can probe

Very deep imagining - Fall target

The Data



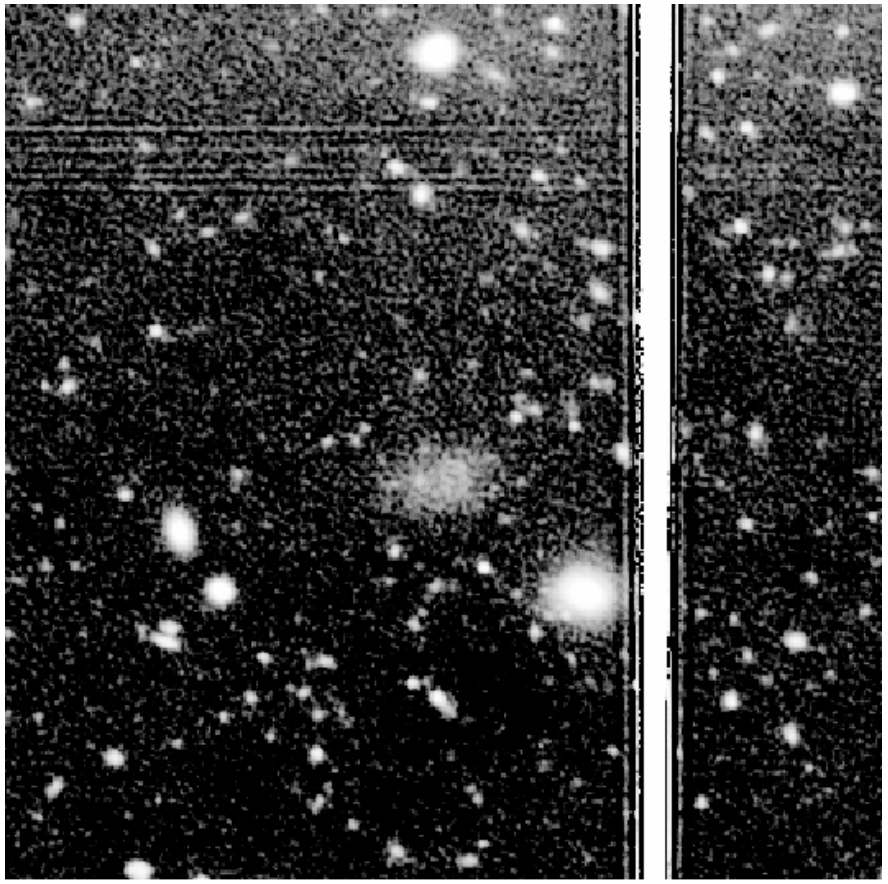
First Candidates



NGC-628-dwB

NGC-628-dwA

First Candidates



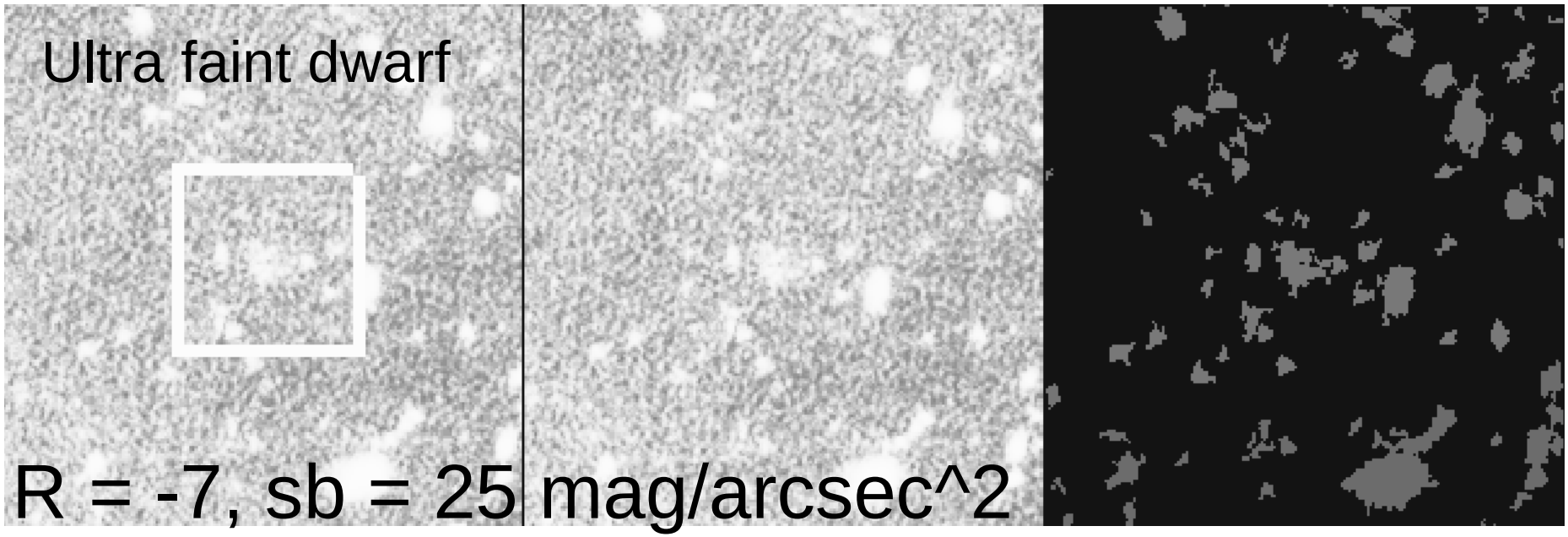
	m_B	m_V
NGC-628-dwA	18.9	18.2
NGC-628-dwB	> 22.9	22.1

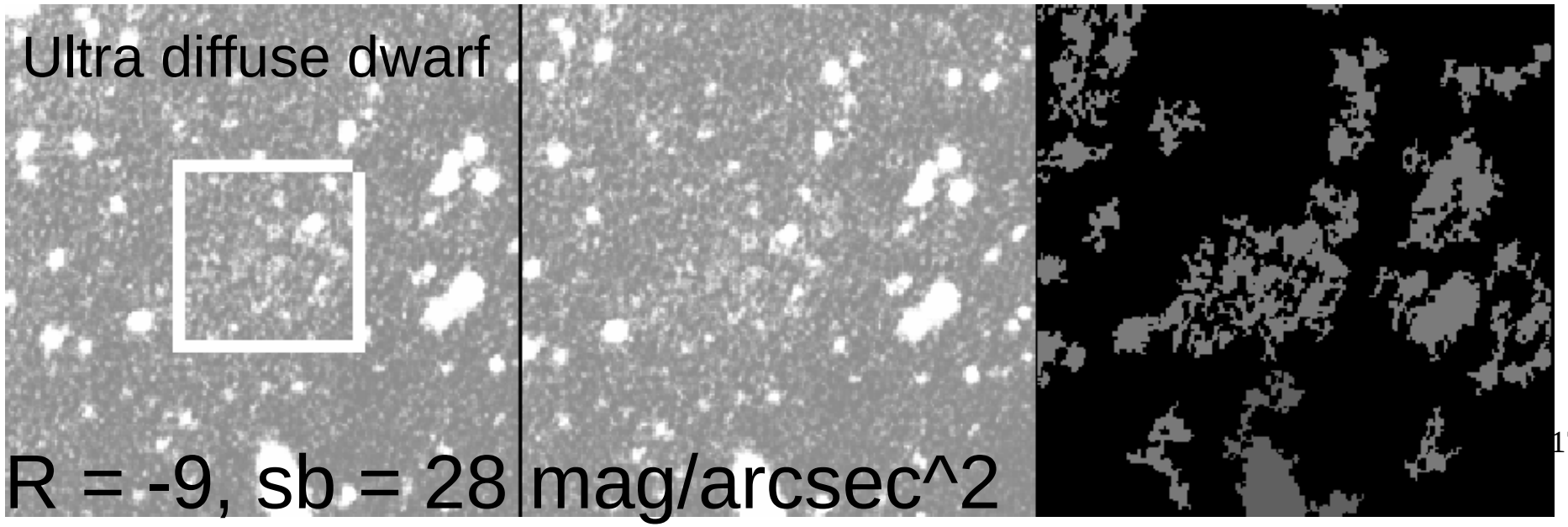
Both red, non-star forming, gas poor and have small projected distances from host

Method

- Using Source Extractor software to identify objects
- Inserting and recovering fake galaxies
- Computing completeness
- Using properties of fake galaxies in data, finding new candidates

Sample of recovered galaxies





Conclusion

Characterizing 20 new systems down to ultra faint and ultra diffuse regimes

=> constrain the Stellar mass – DM halo relation

=> constrain DM models based on their predicted subhalo populations