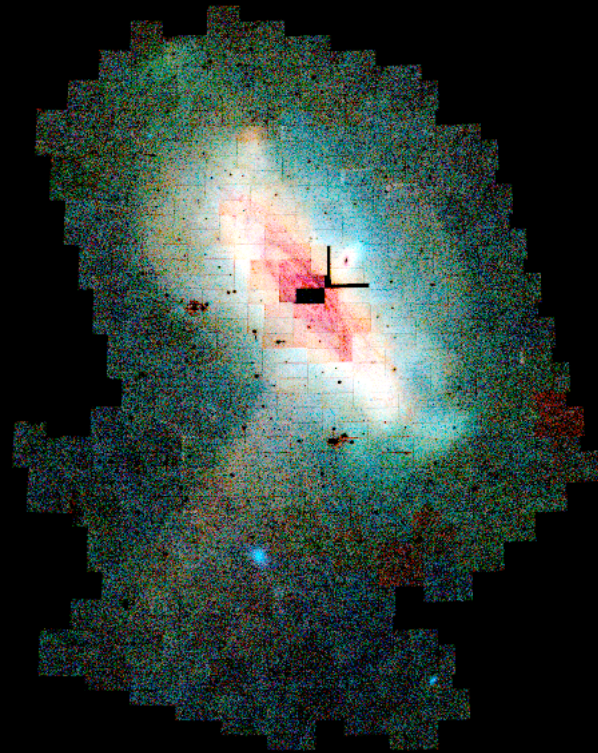




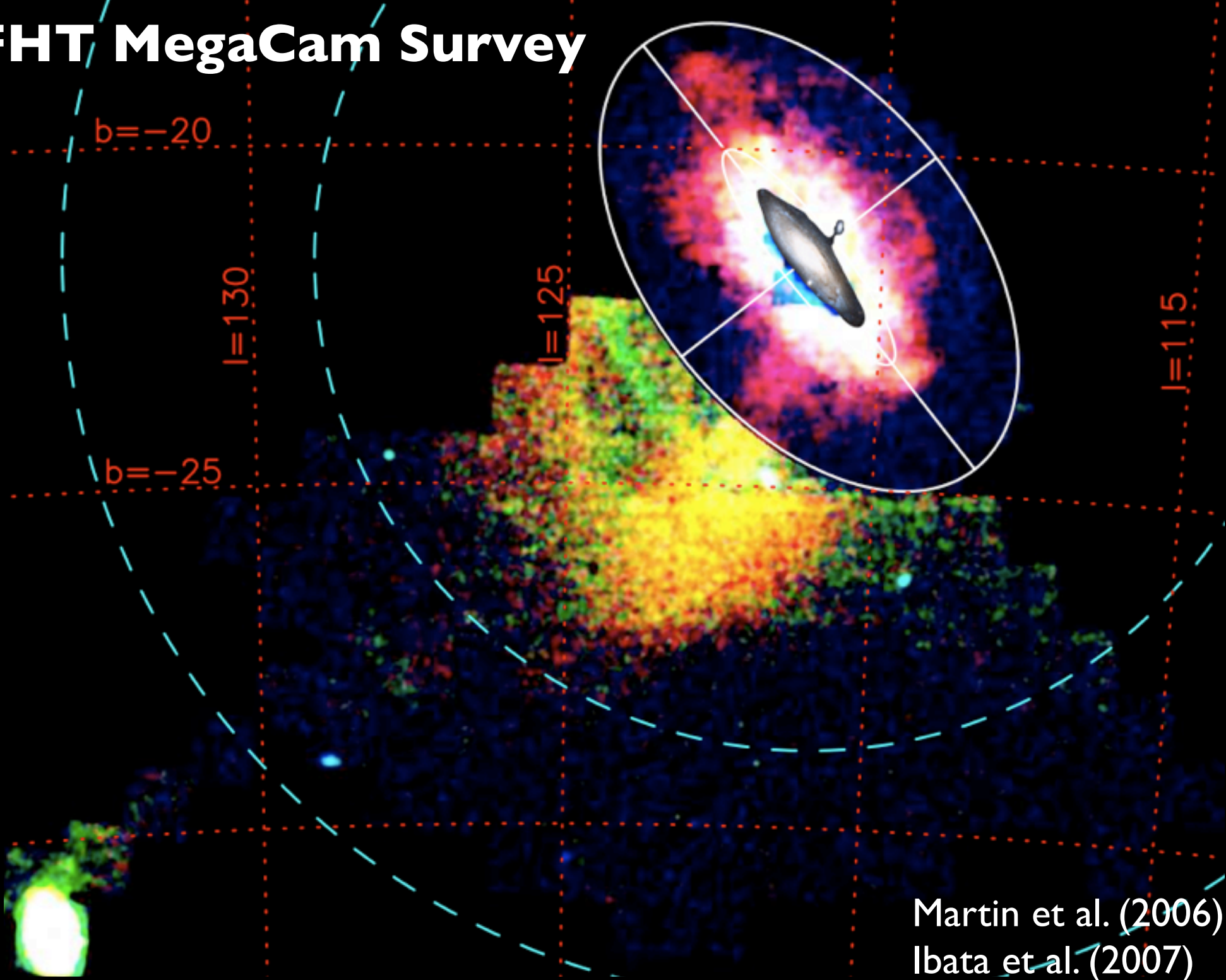
The dwarf galaxy - globular cluster connection
Michigan, 29th August 2007

Dwarfs, environment and the Local Group

Alan W. McConnachie
University of Victoria

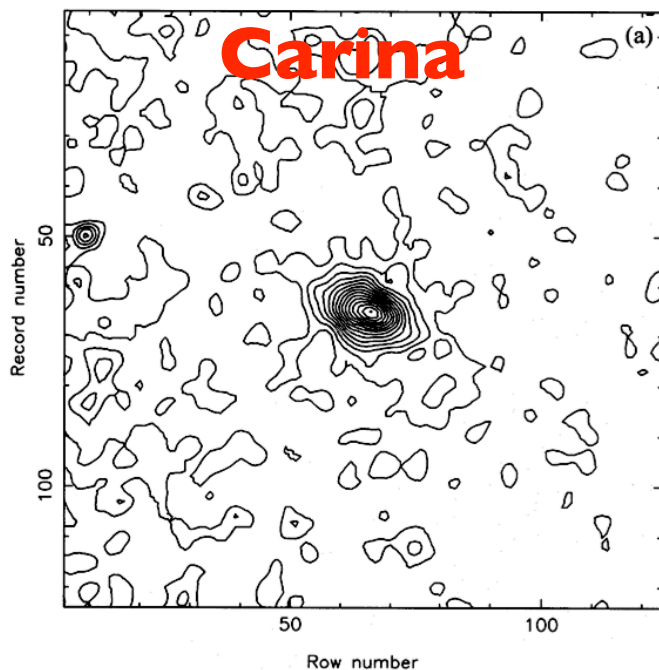


CFHT MegaCam Survey

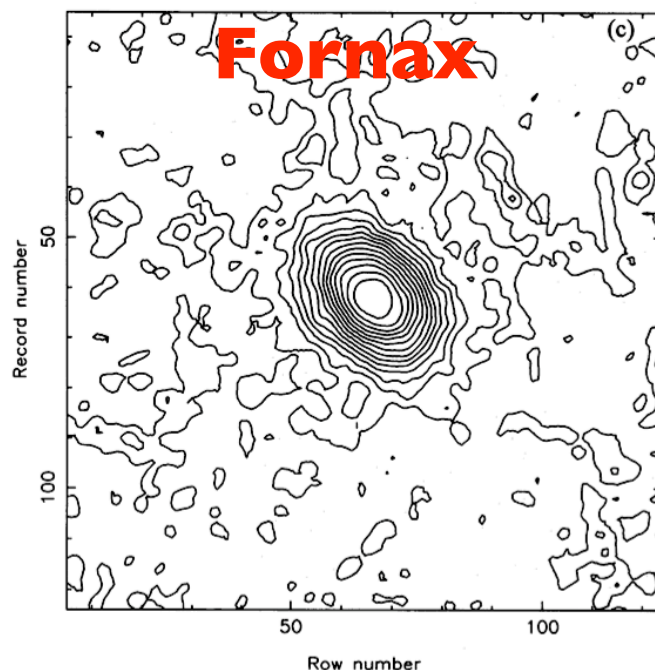


Martin et al. (2006)
Ibata et al. (2007)

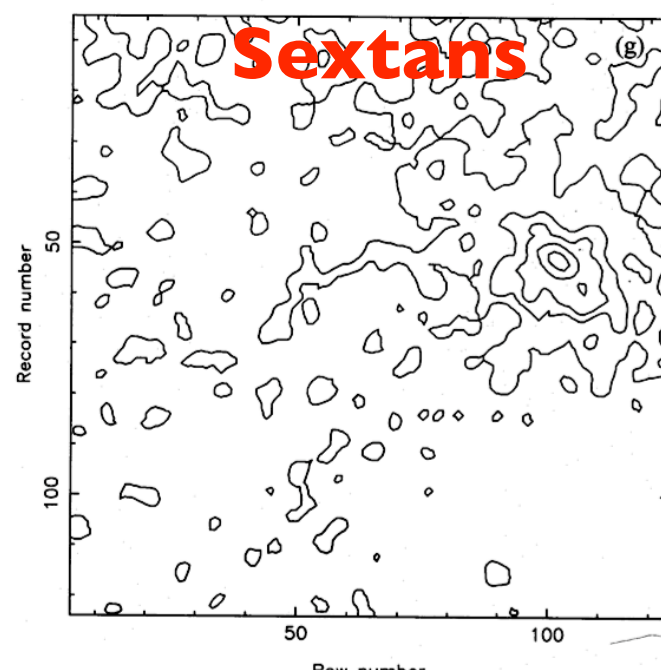
Carina



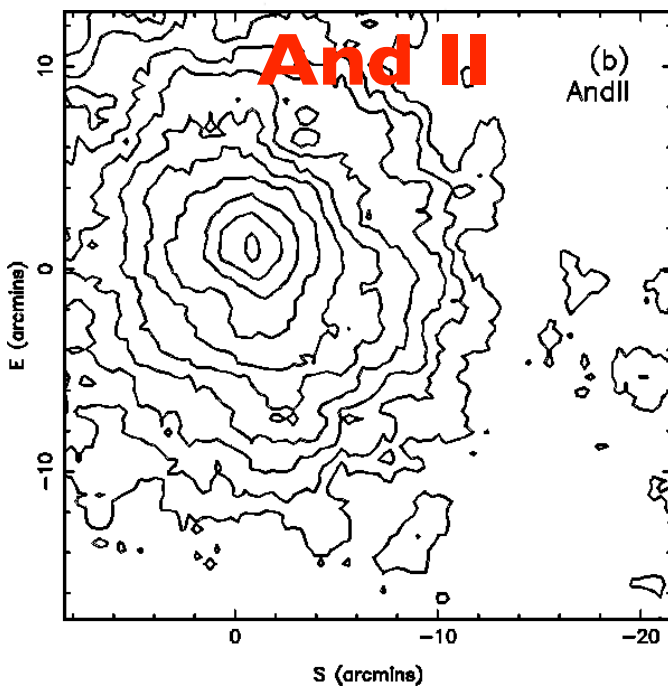
Fornax



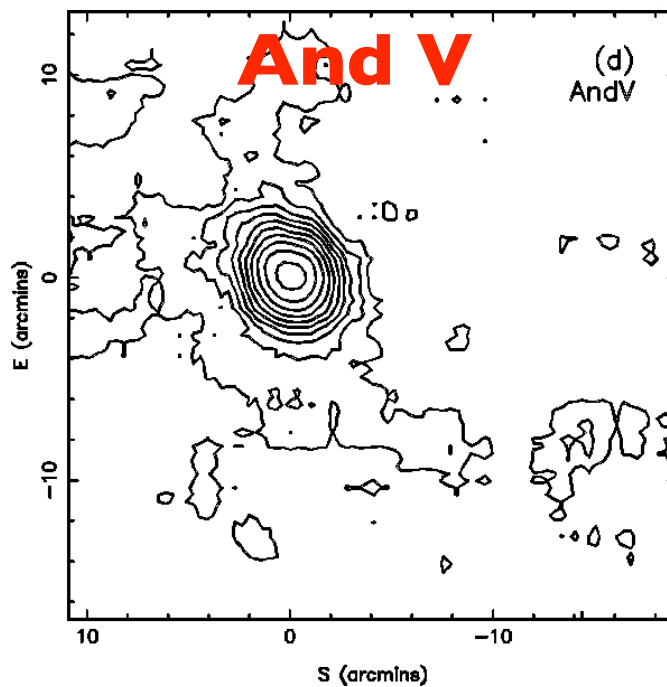
Sextans



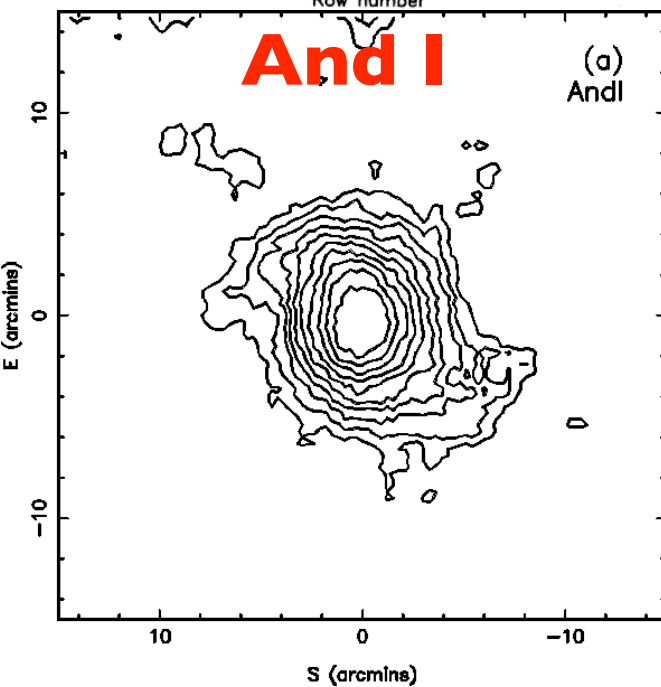
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Row number



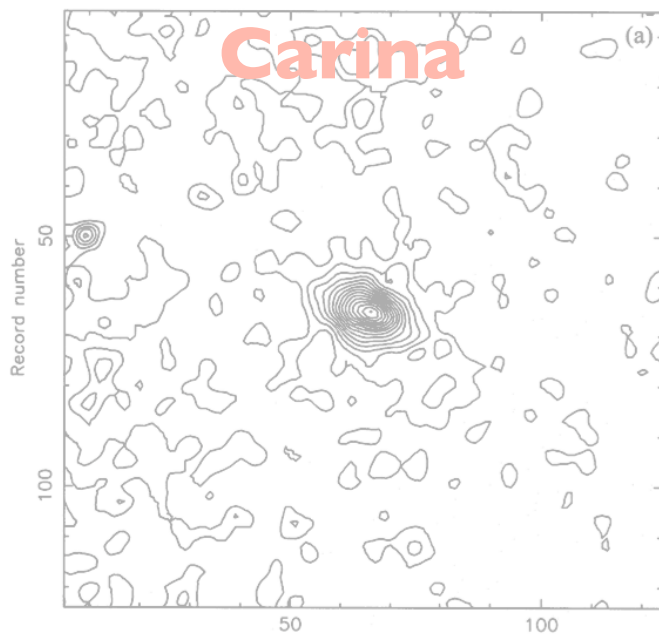
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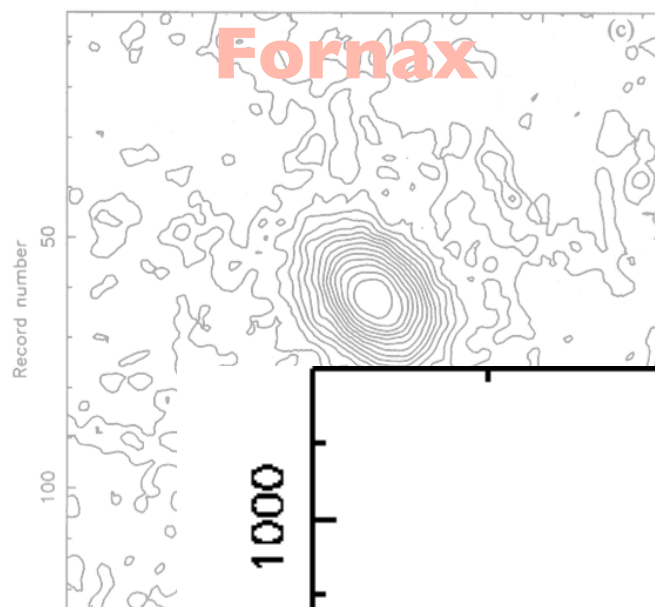
MW: Irwin & Hatzidimitriou (1995)

M3I: McConnachie & Irwin (2006)

Carina



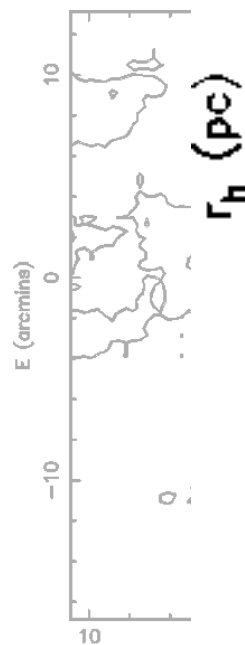
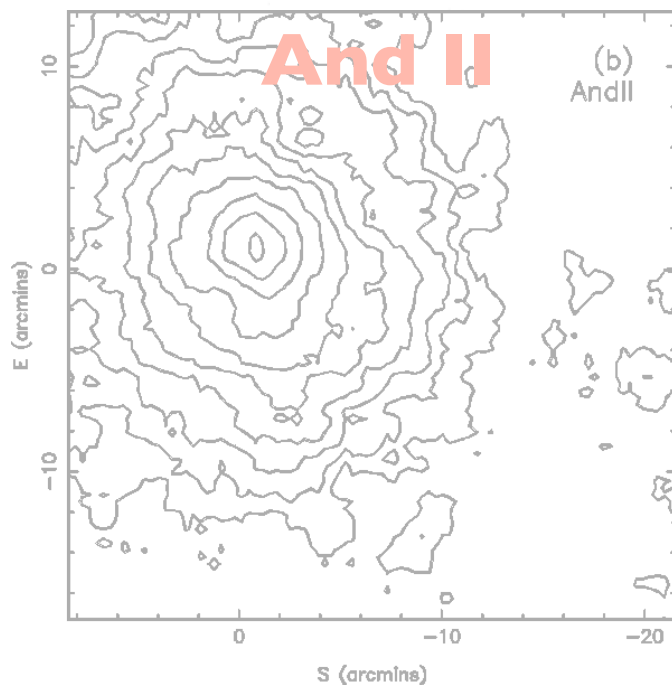
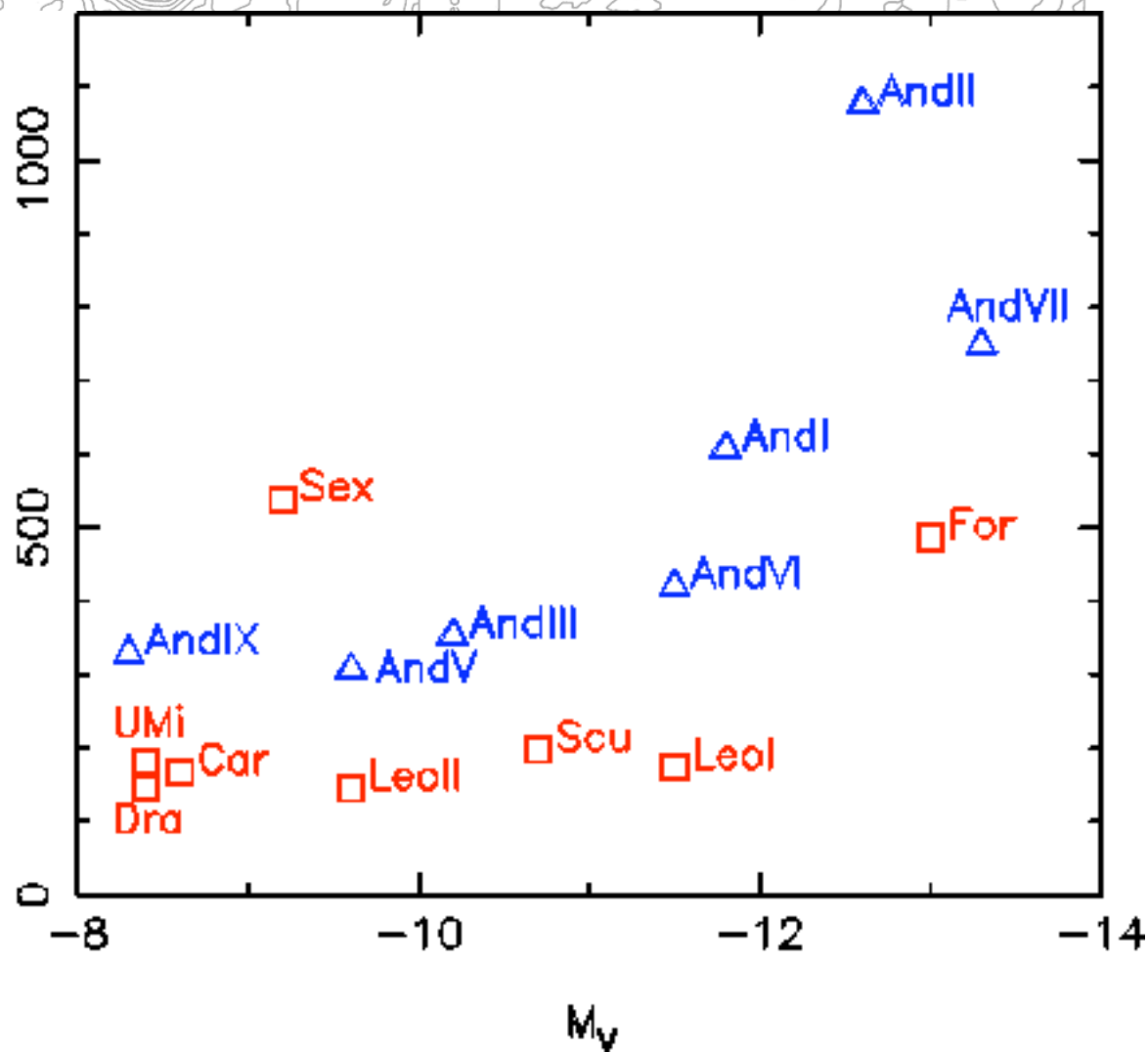
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Sextans



Row number

 r_h (pc)

Carina

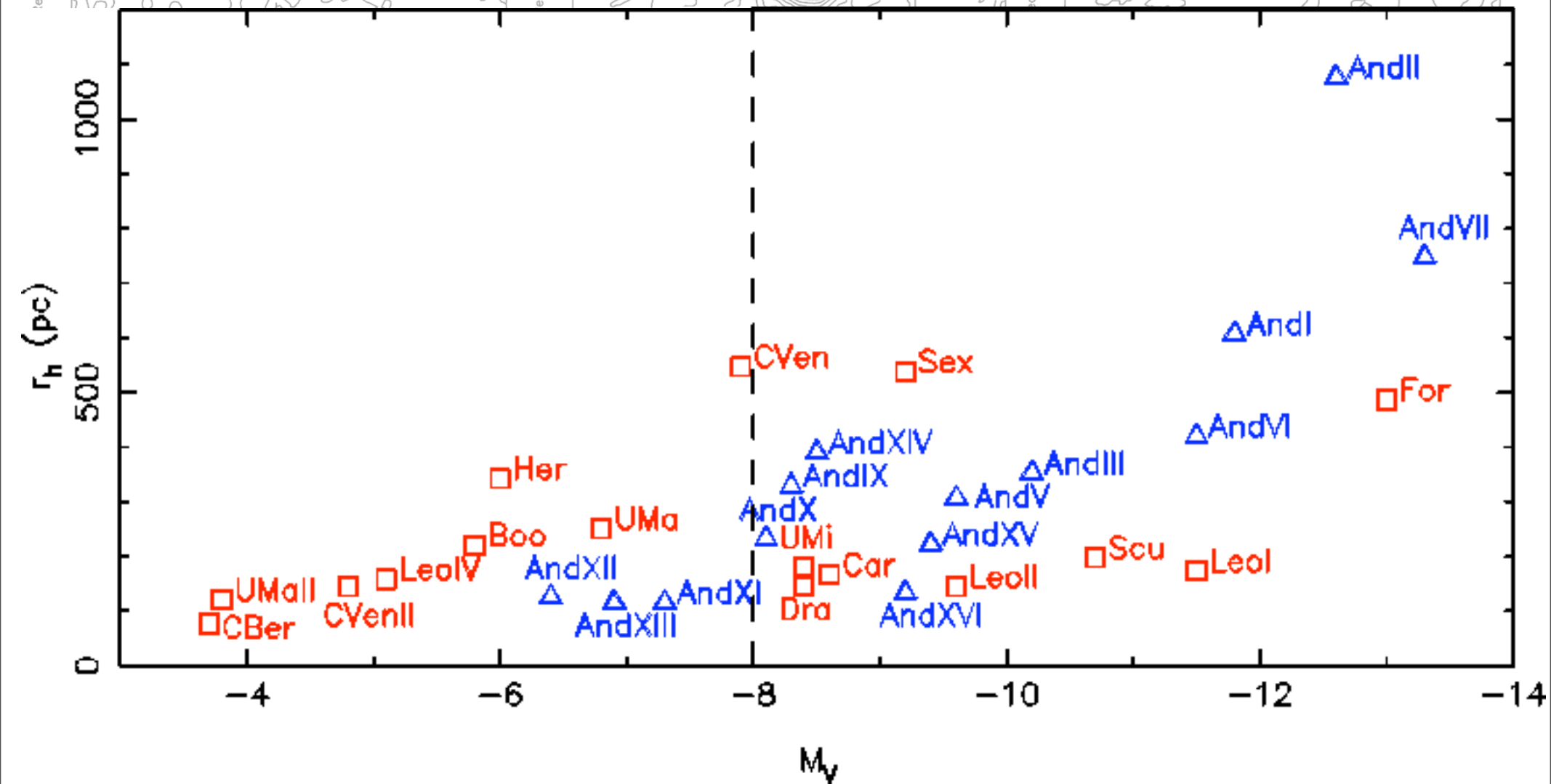
Fornax

Sextans

Carina

Fornax

Sextans



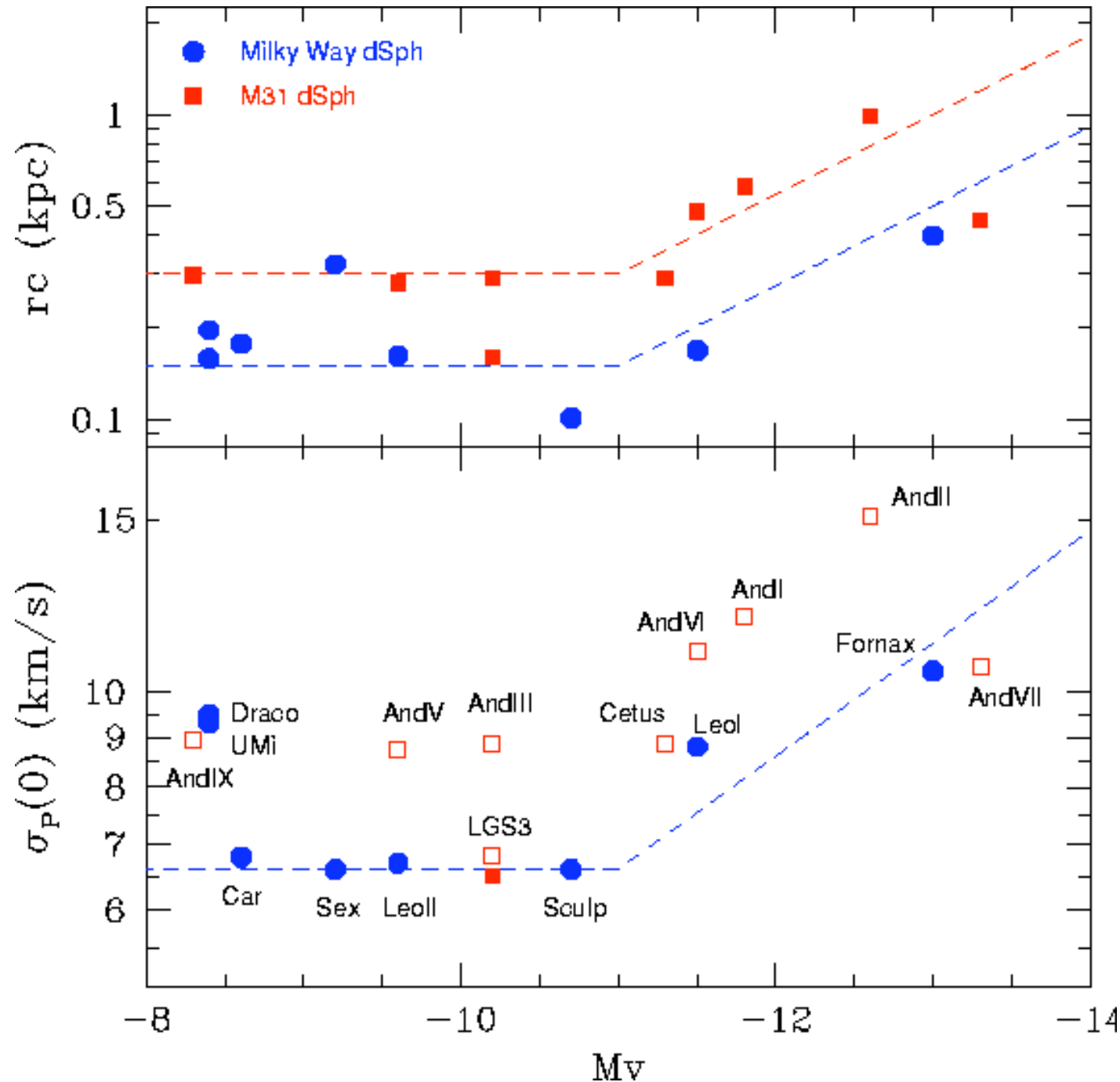
(Haloes in isolation)

1. MW and M31 satellites occupy similar haloes?

- expect difference in velocity dispersions

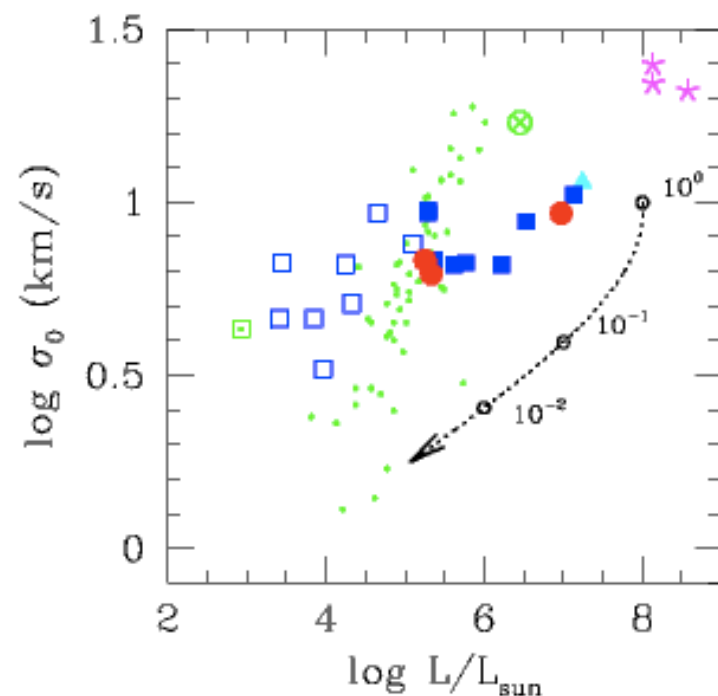
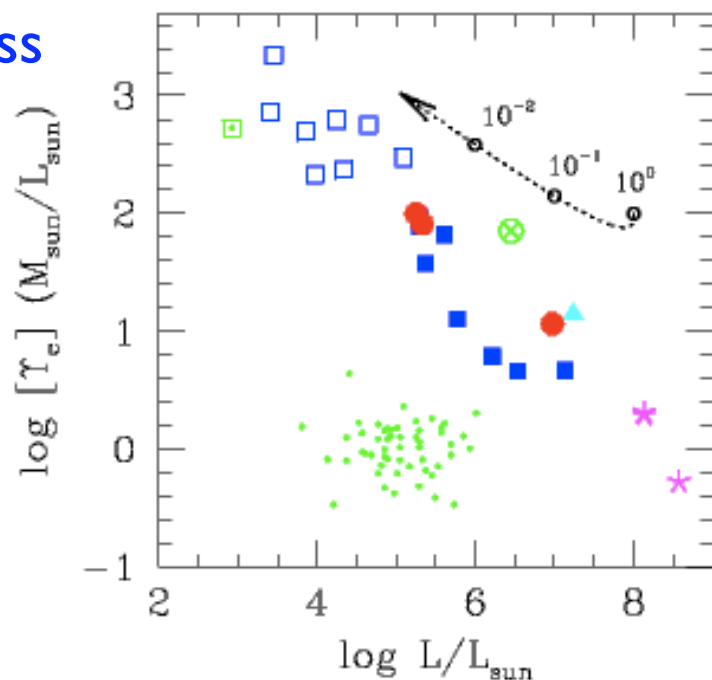
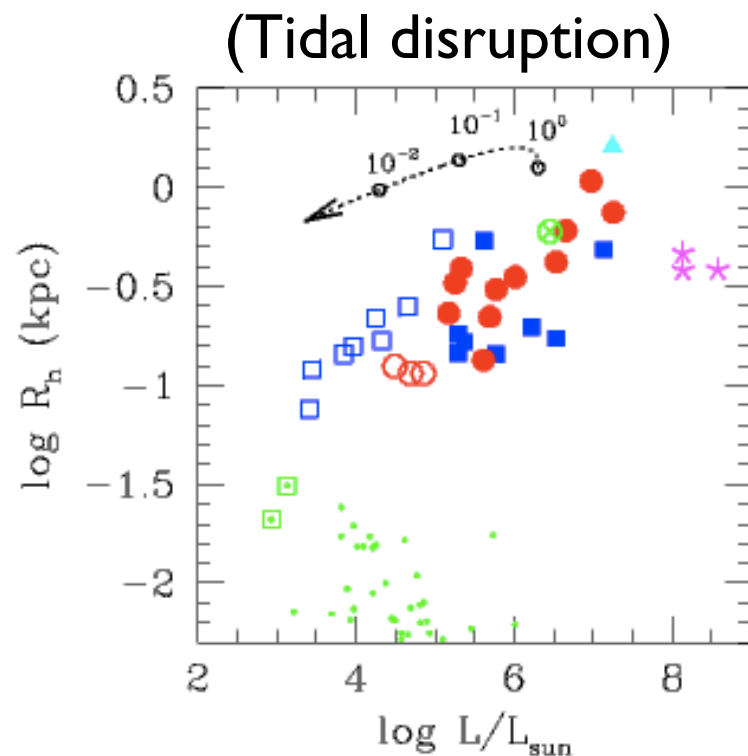
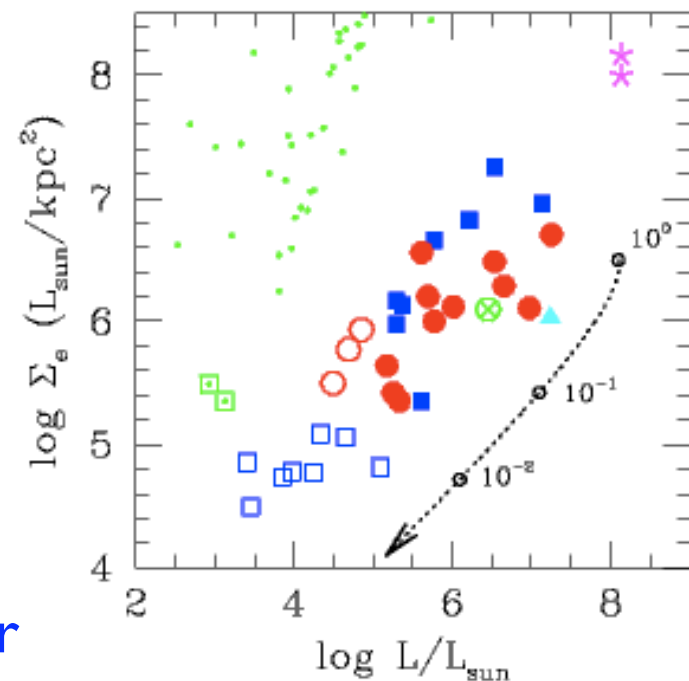
2. MW and M31 have similar velocity dispersions

- haloes would be less massive around M31

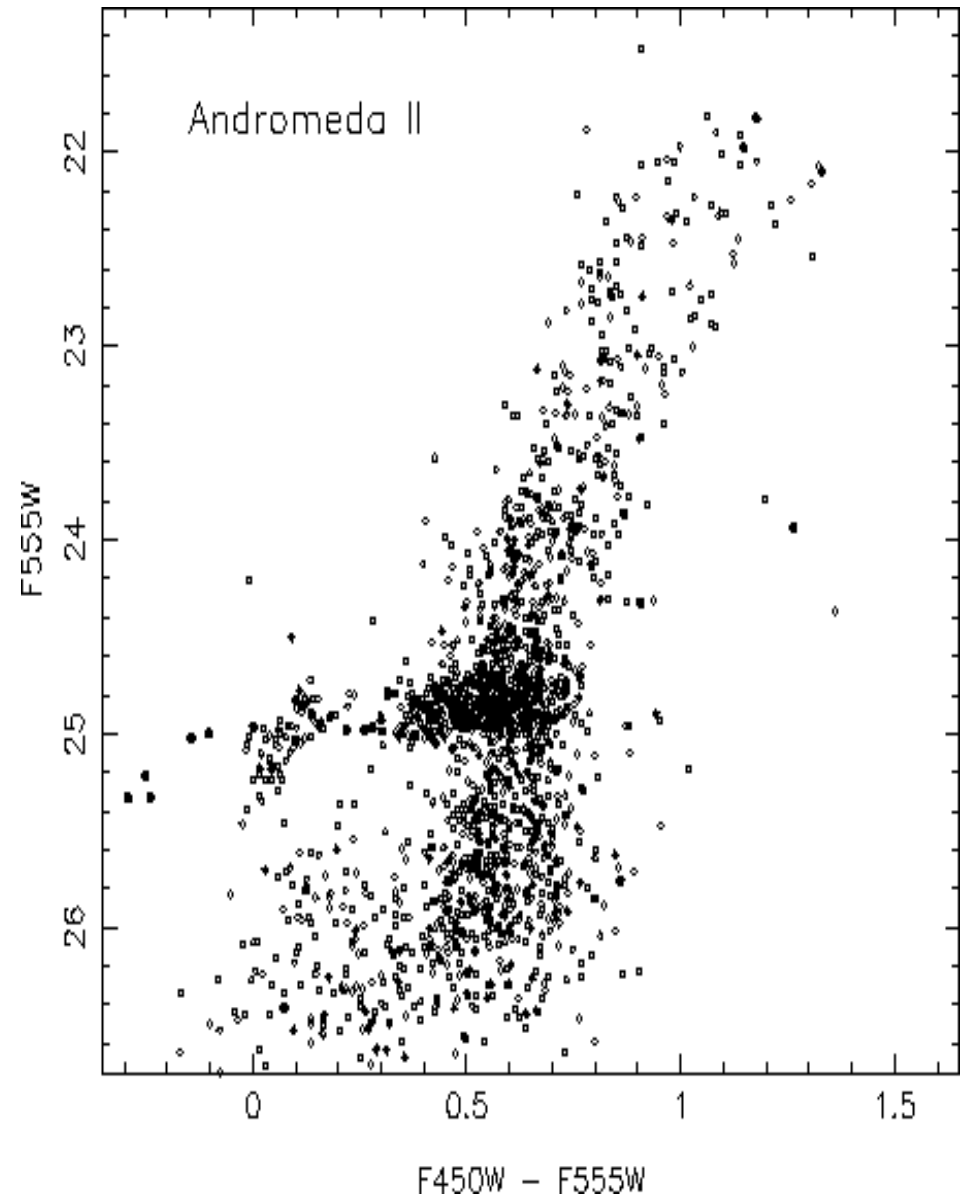


3. MW and M31 satellites have had a different tidal evolution

- but tides don't lower core/half-light radius and surface brightness simultaneously



HST WFPC2 deep photometry
Da Costa et al.: 1996, 2000, 2002

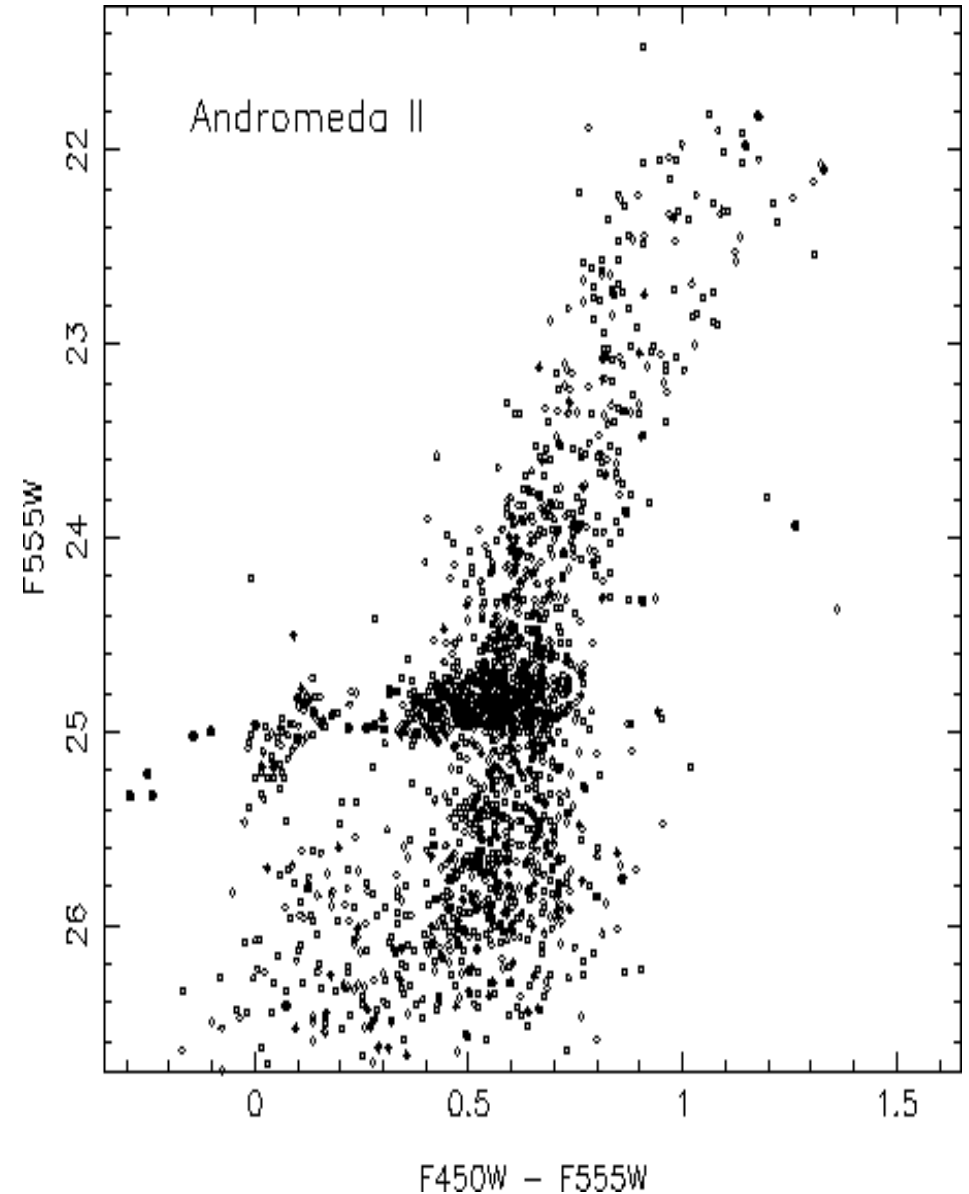
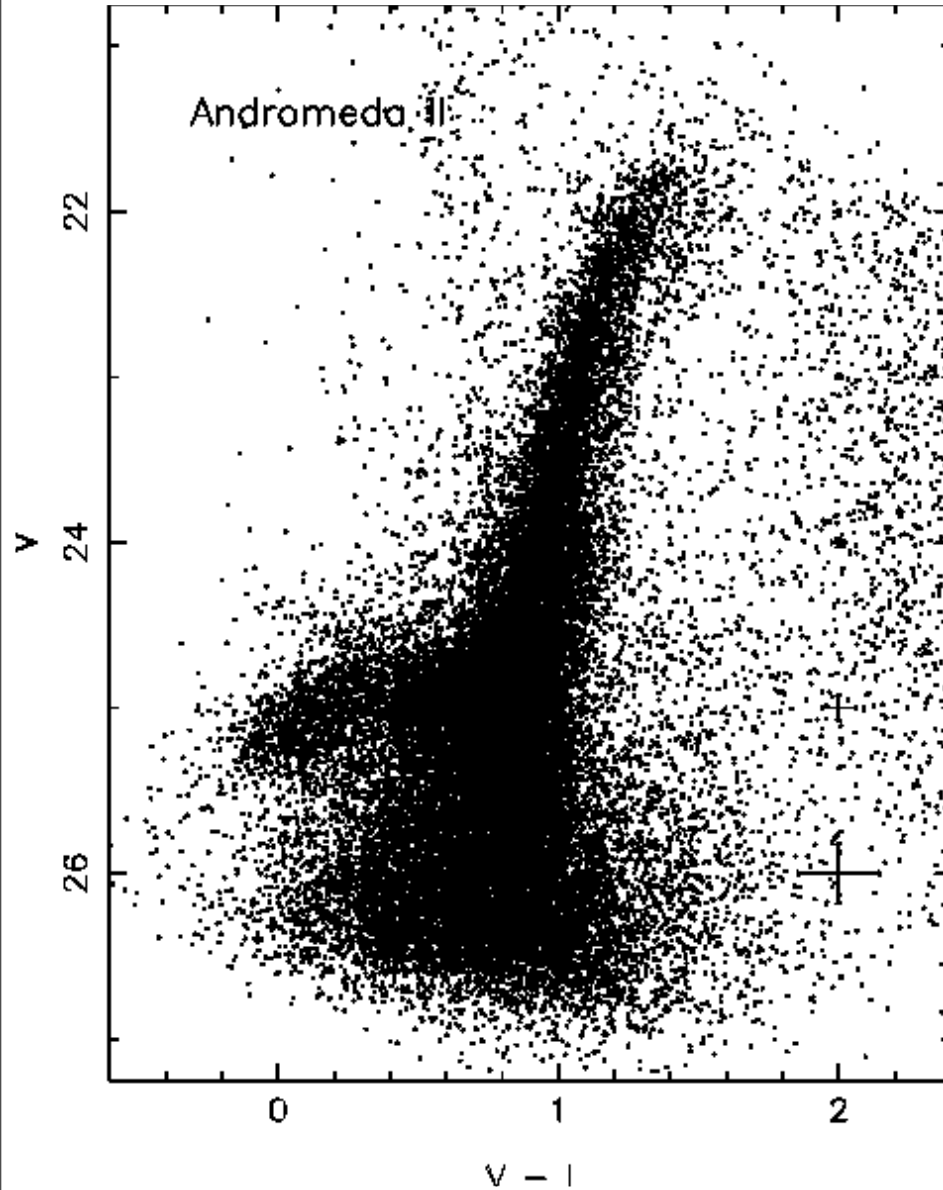


McConnachie, Arimoto & Irwin (2007)

Subaru Suprime-Cam deep photometry

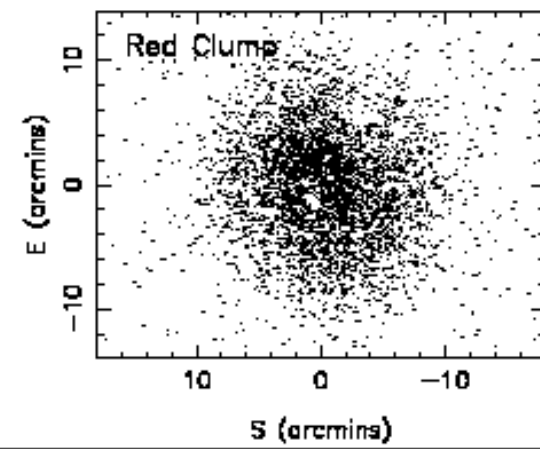
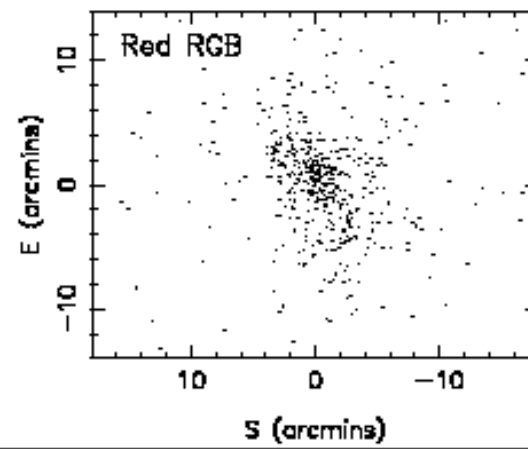
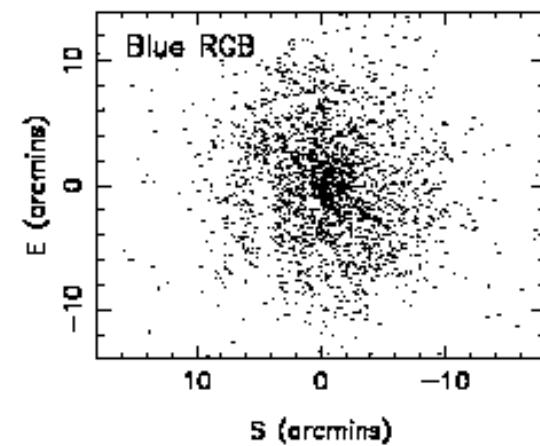
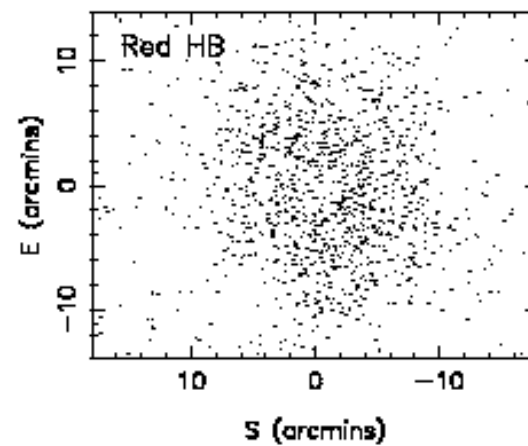
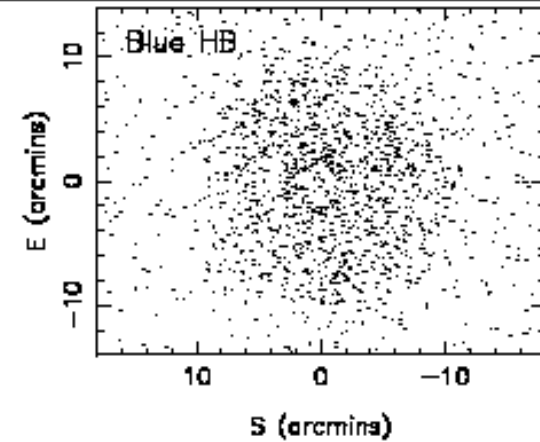
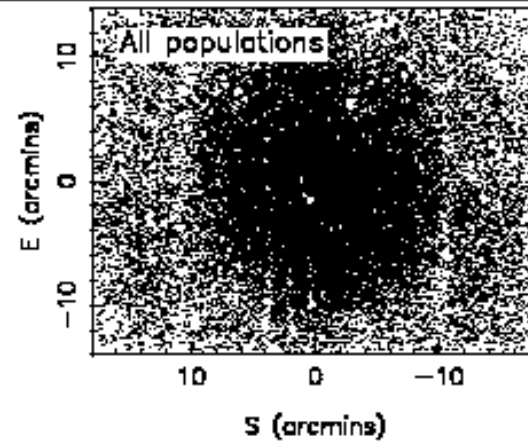
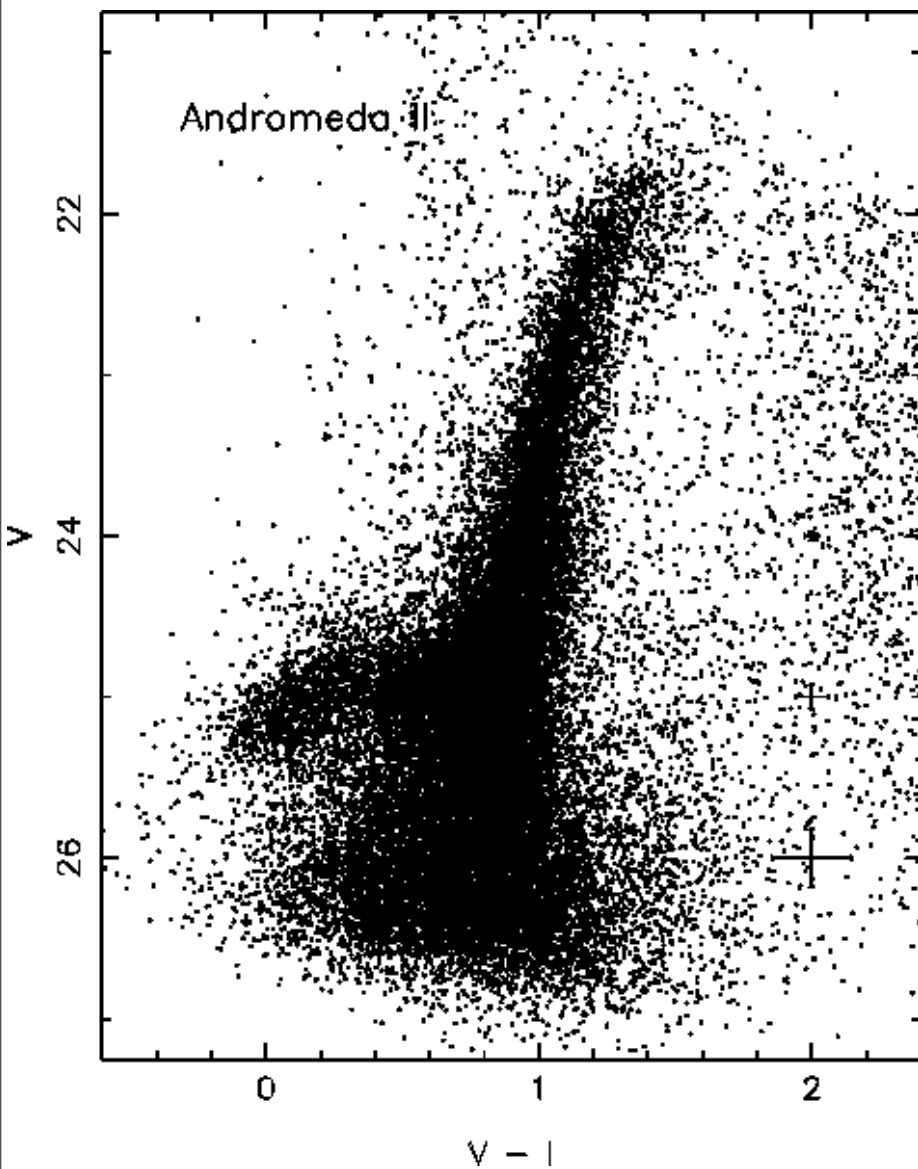
HST WFPC2 deep photometry

Da Costa et al.: 1996, 2000, 2002

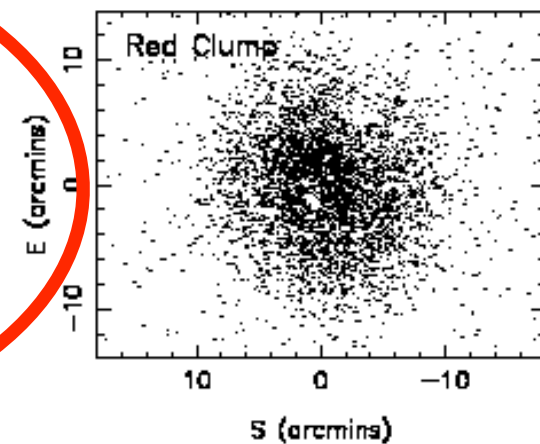
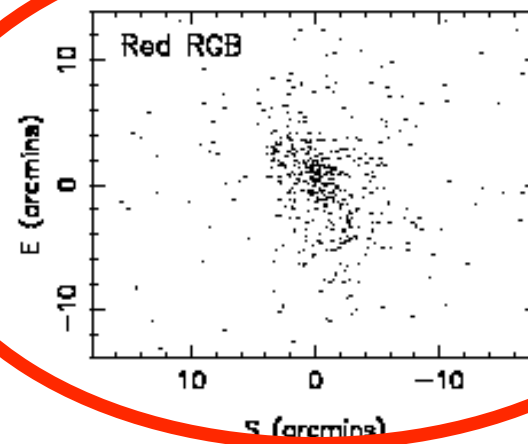
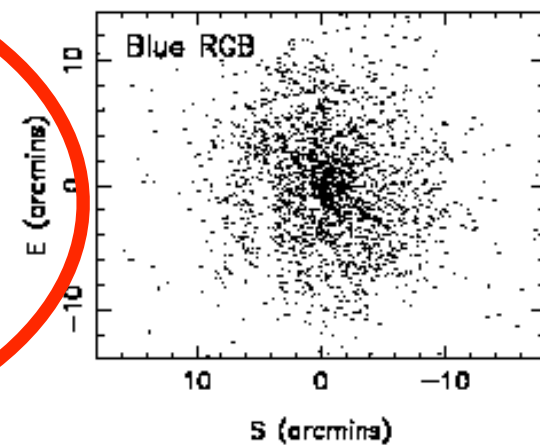
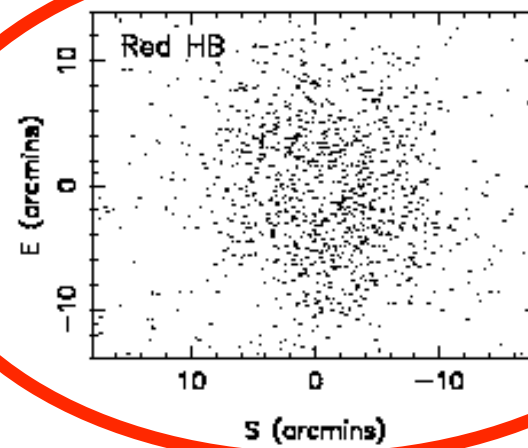
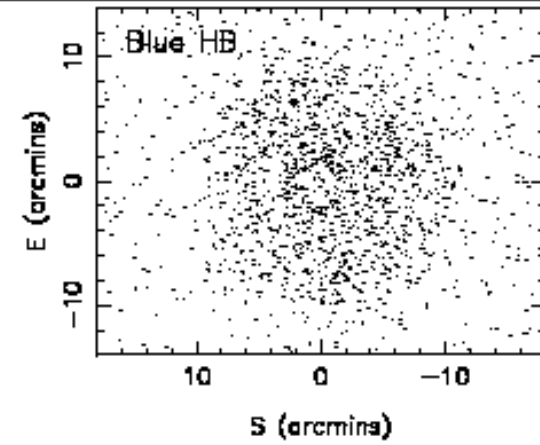
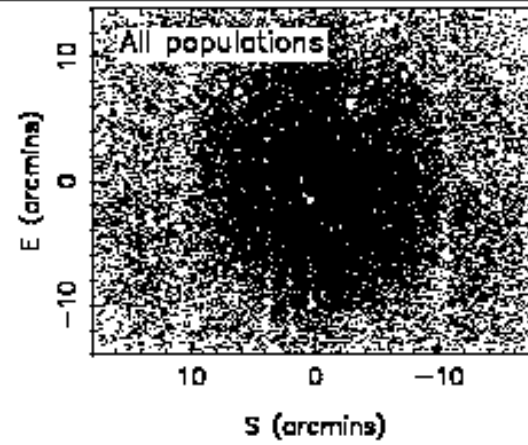
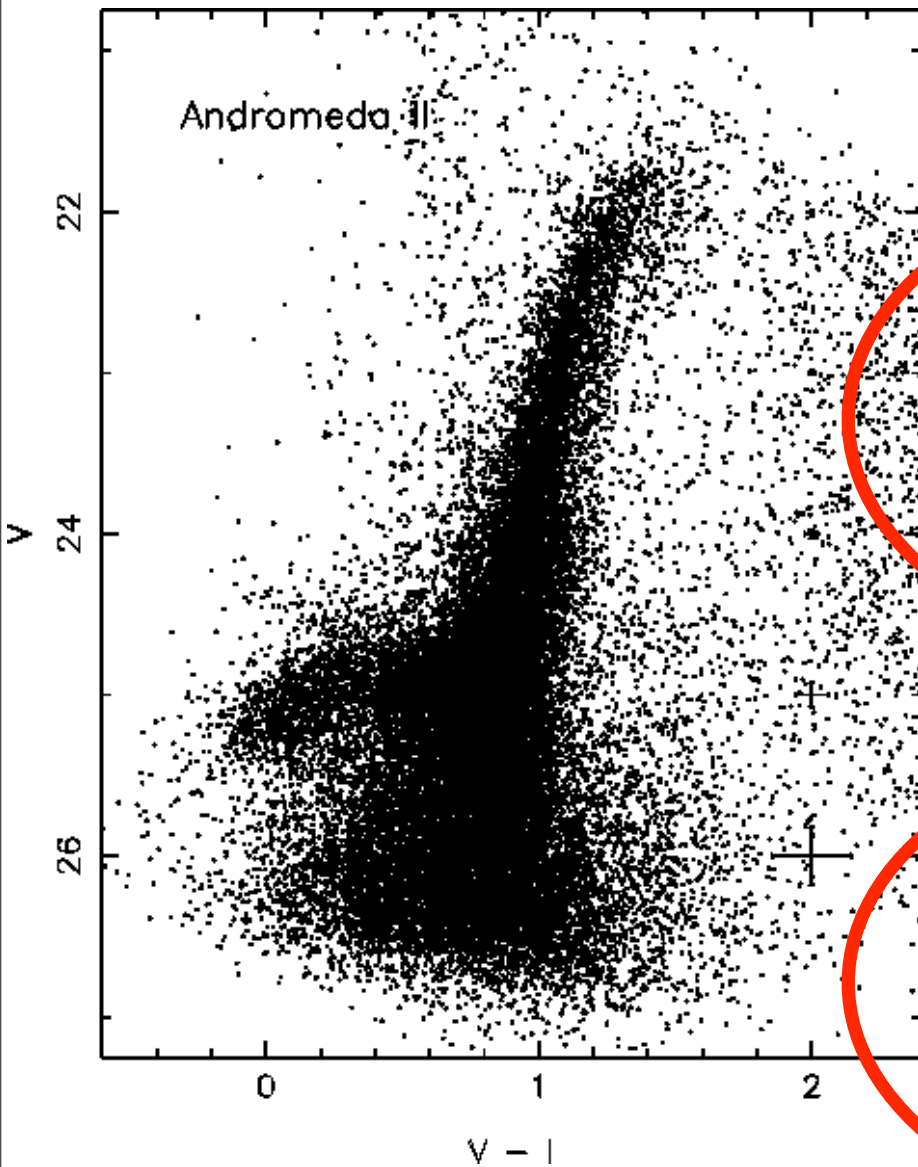


SuprimeCam wide field view ideal for Local Group galaxies

Spatial structure of Andromeda II

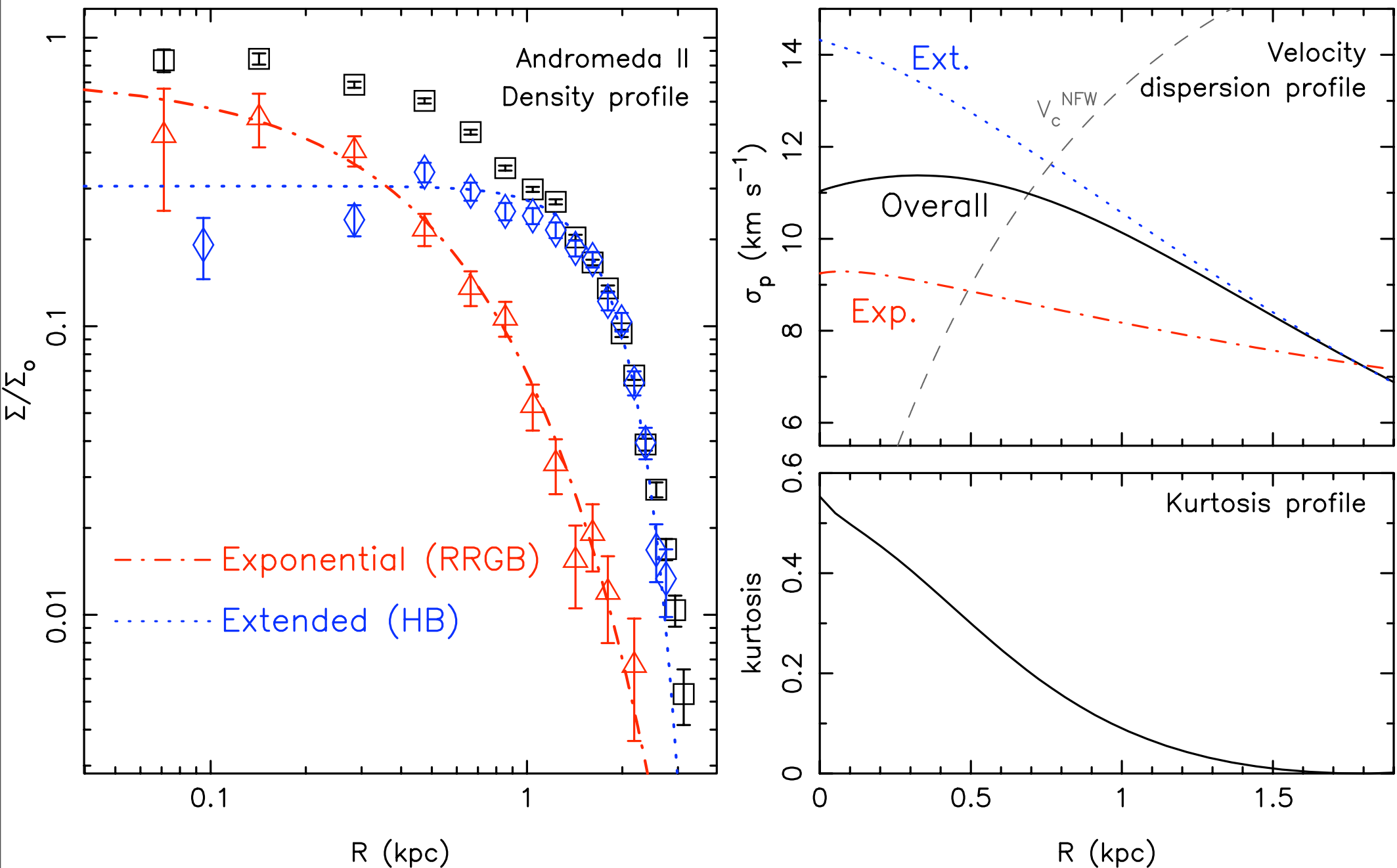


Spatial structure of Andromeda II



McConnachie, Penarrubia & Navarro (2007)

Dynamical structure of two stellar components



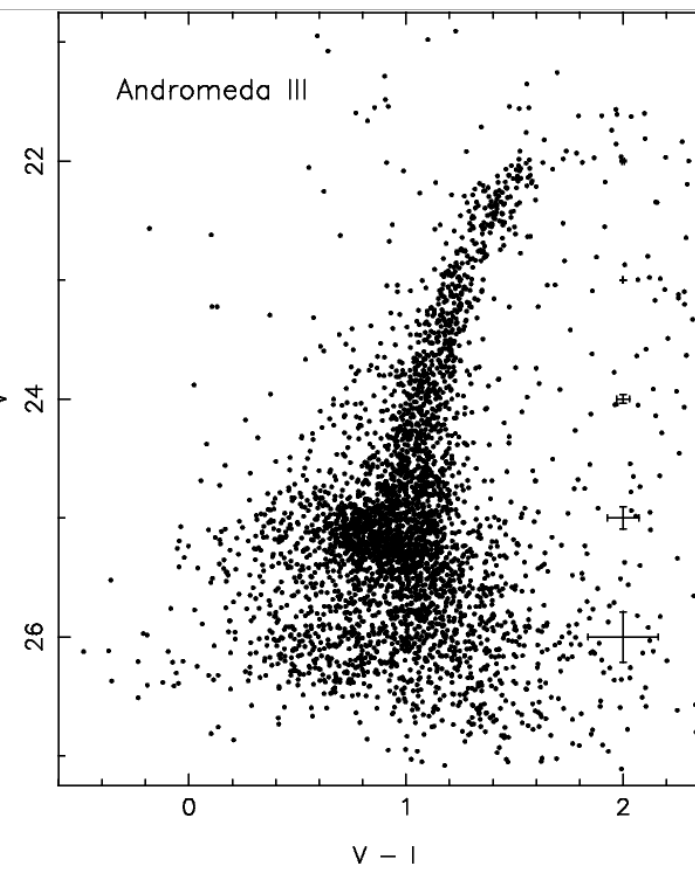
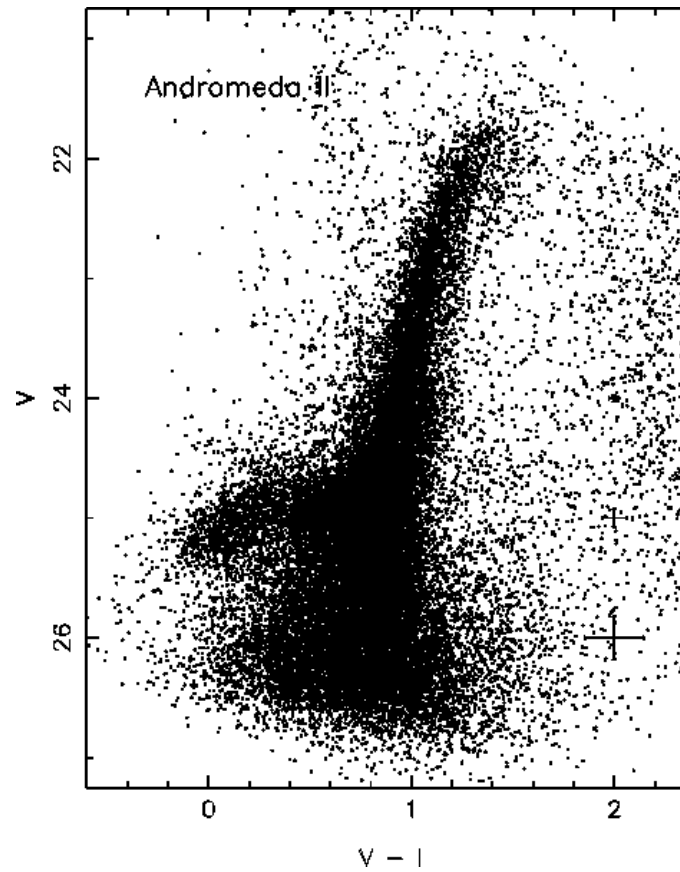
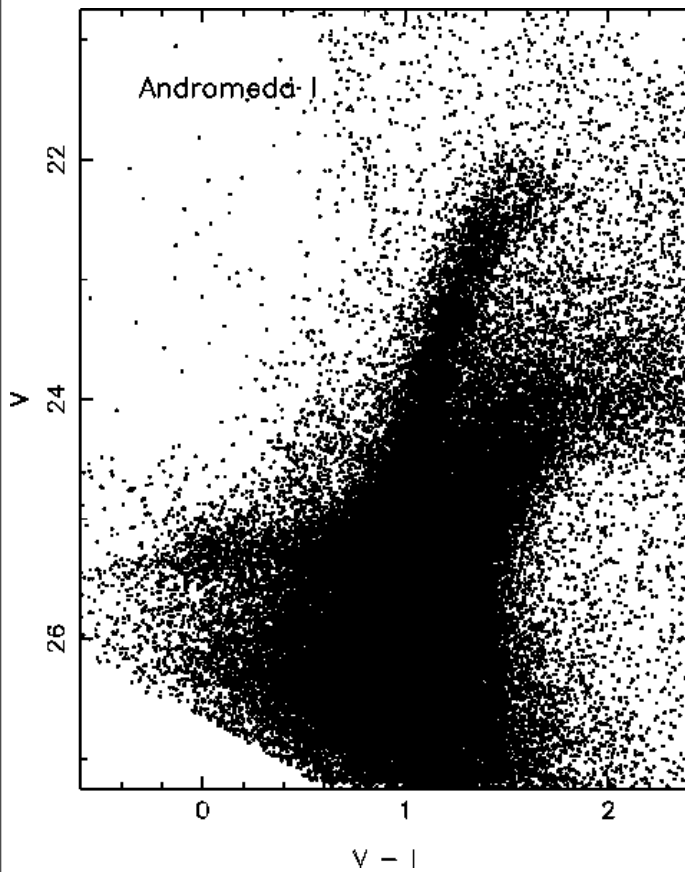
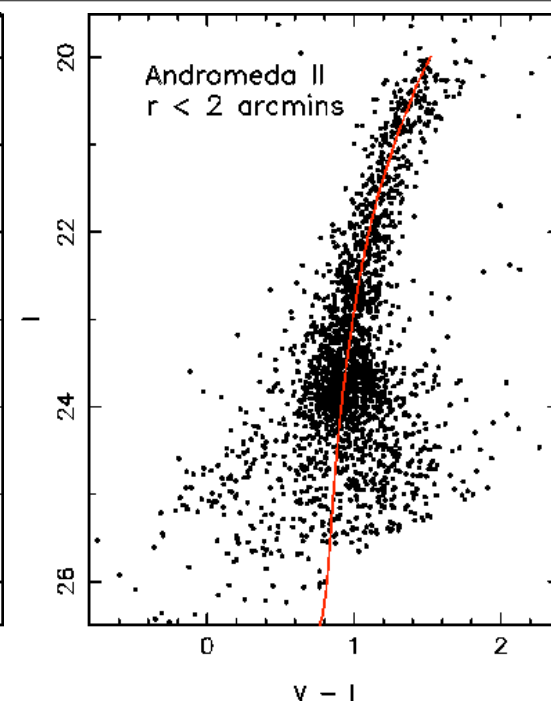
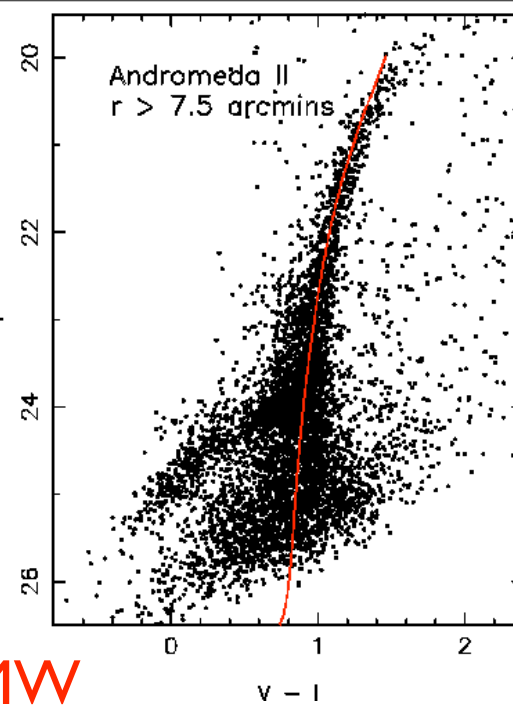
Star Formation Histories of M3 I dSphs

Right: inner and outer regions of And II:

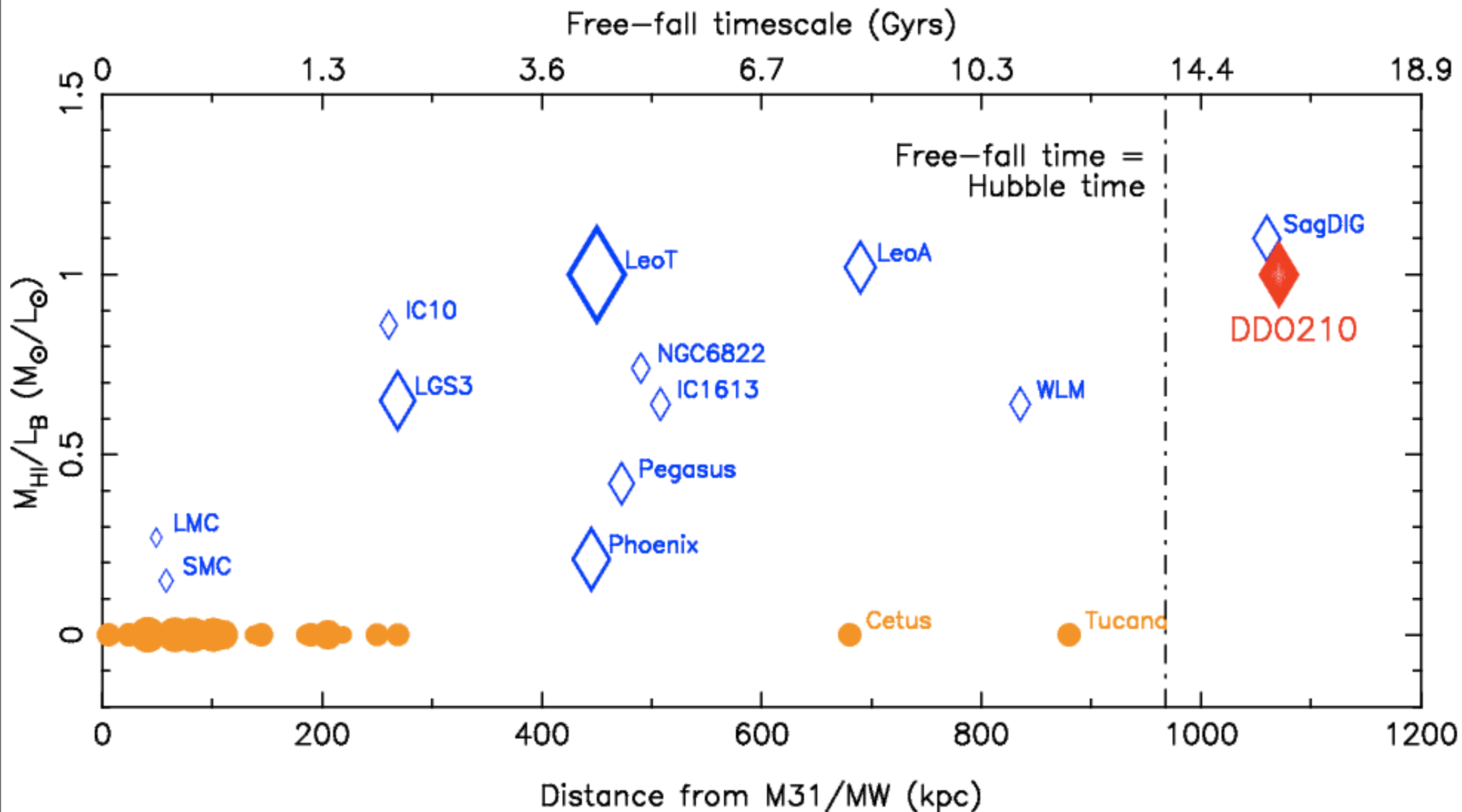
Intermediate age population dominant in center

Below: CMDs for And I, II & III:

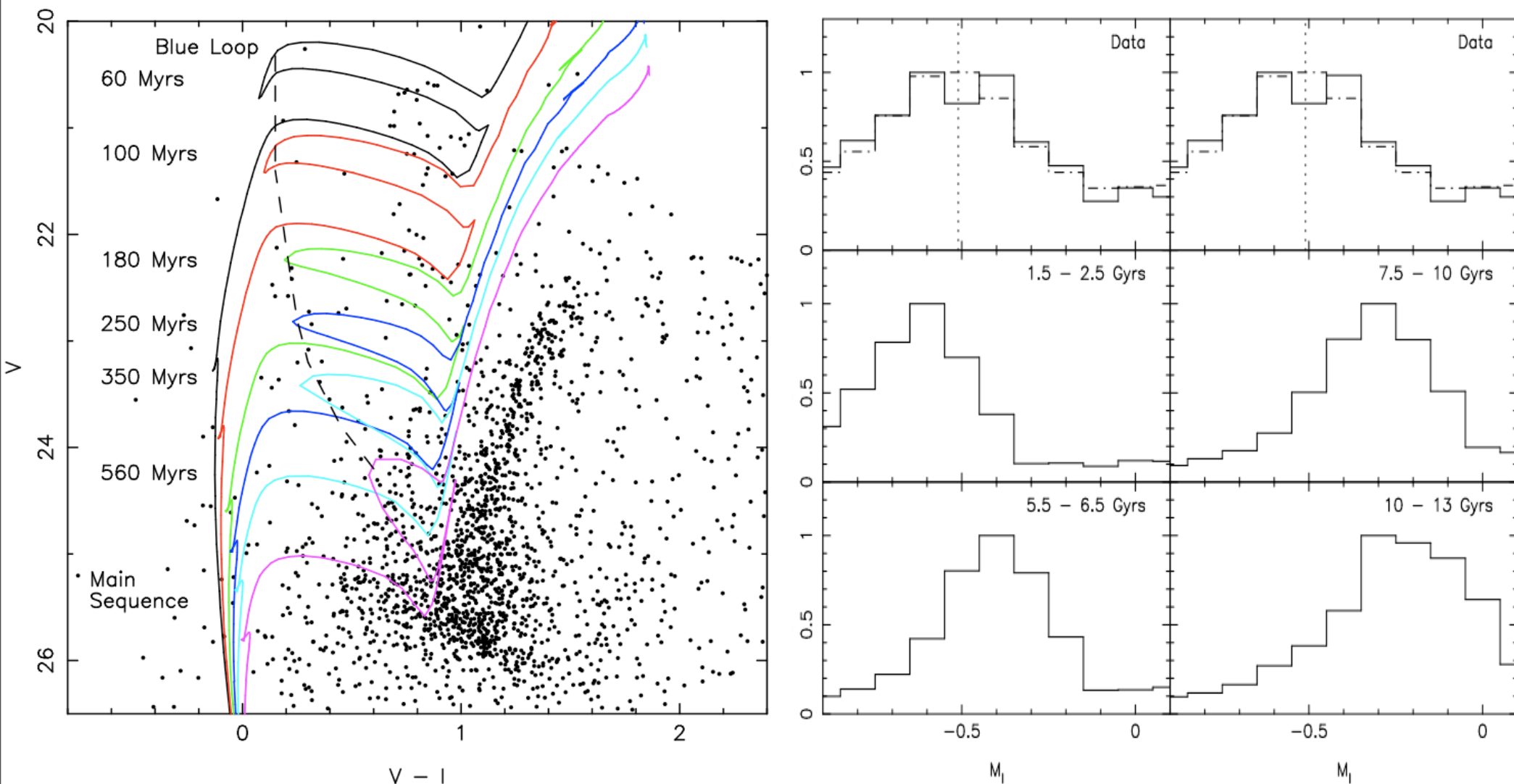
HBs systematically redder than for MW



How many galaxies in the Local Group have **NOT** (likely) been affected by tides?

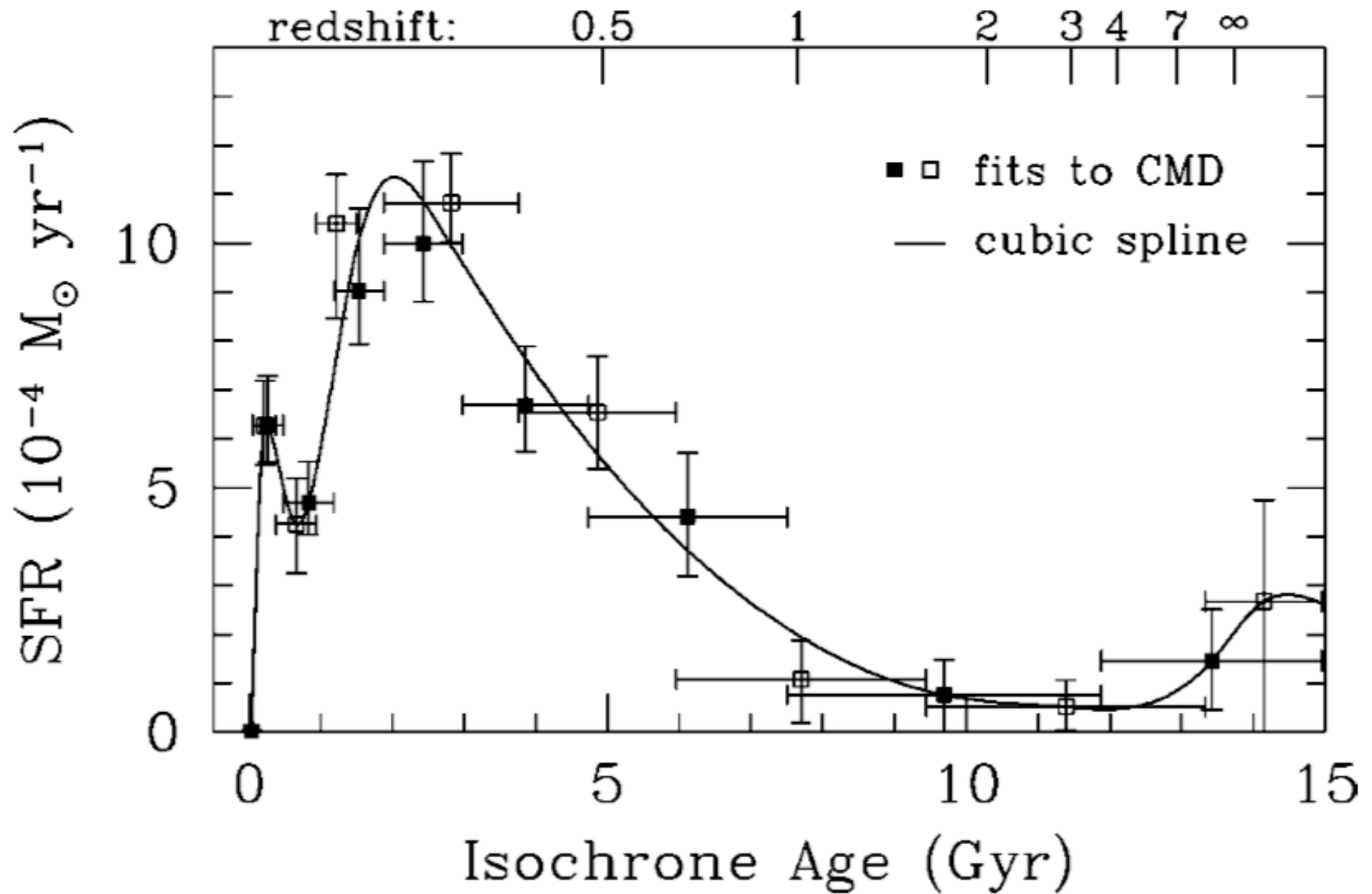


McConnachie, Arimoto, Irwin & Tolstoy 2006



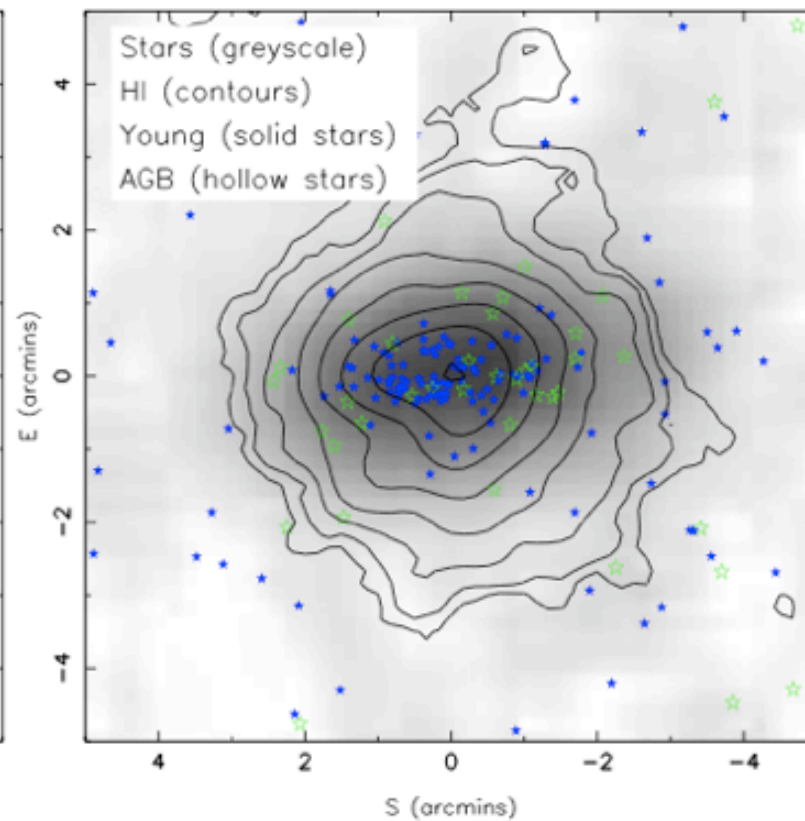
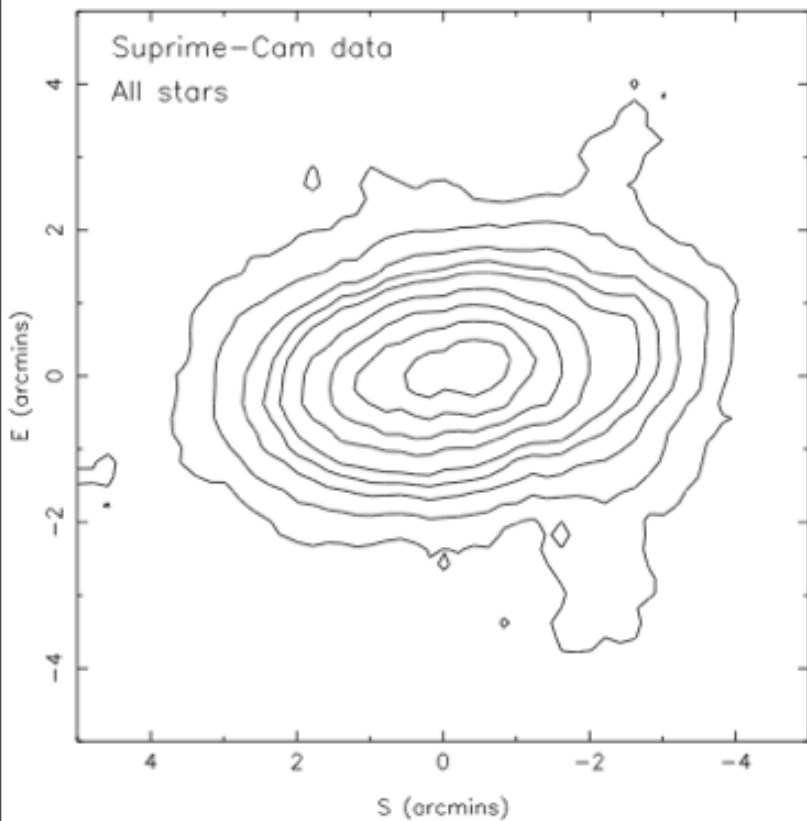
• Red clump, blue loop of stars suggests intermediate and young stellar populations: **no obvious strong old population. Most stars approximately 4 Gyrs old.**

• cf. Leo A (Cole et al. 2007). Coincidence that they are so isolated?

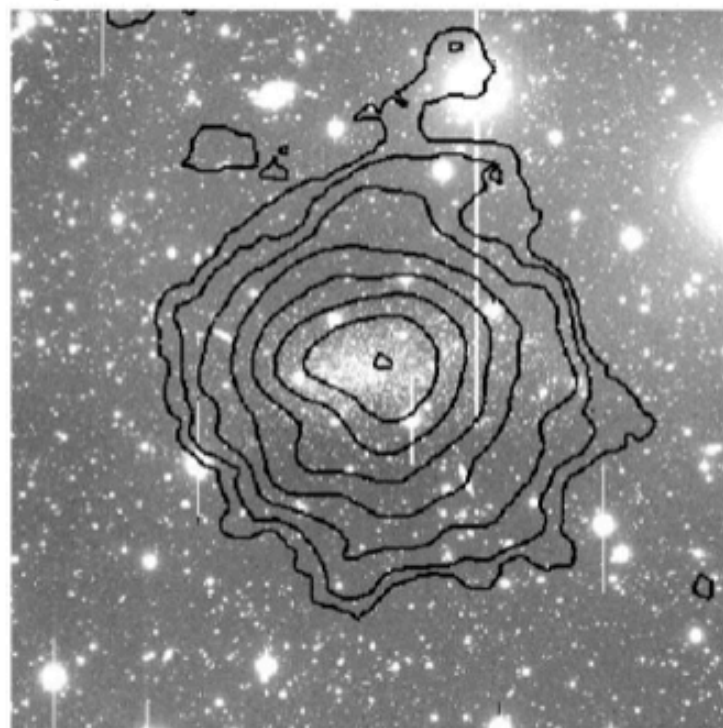


• Red clump, blue loop of stars suggests intermediate and young stellar populations: **no obvious strong old population. Most stars approximately 4 Gyrs old.**

• cf. Leo A (Cole et al. 2007). Coincidence that they are so isolated?



(HI map from
Young et al. 2003)



Structure of DDO210?

'Inclination' of gas = 27degs
(Begum & Chengalur 2004)

'Inclination' of stars = 60degs

**Are the stars in DDO210
in a disk? What about
dlrr galaxies in general?**

Summary

- M3 I dSphs **more extended, lower surface brightness** than the Milky Way population. Why?
- M3 I population appear to have **systematically redder HBs (?) Few (if any) young stars.** Why?
- How common are **multiple dynamical components** in dSphs? Formation scenarios?
- **Tides and star formation histories** - how closely are they related? What is the SFH of a **tidally unperturbed dwarf?**
- What is the **stellar structure of dlrr galaxies?** cf. gaseous structure? **How are dlrrs related to dSphs?**