

Low surface brightness galaxies as probe of DM haloes

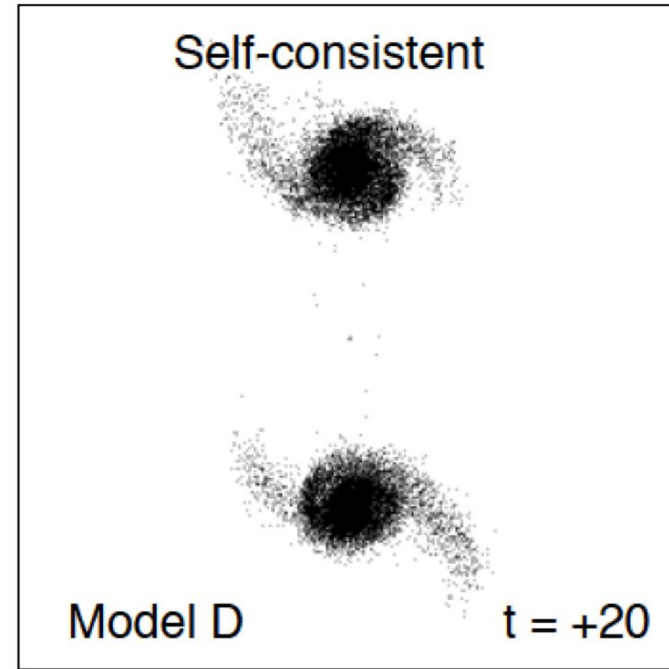
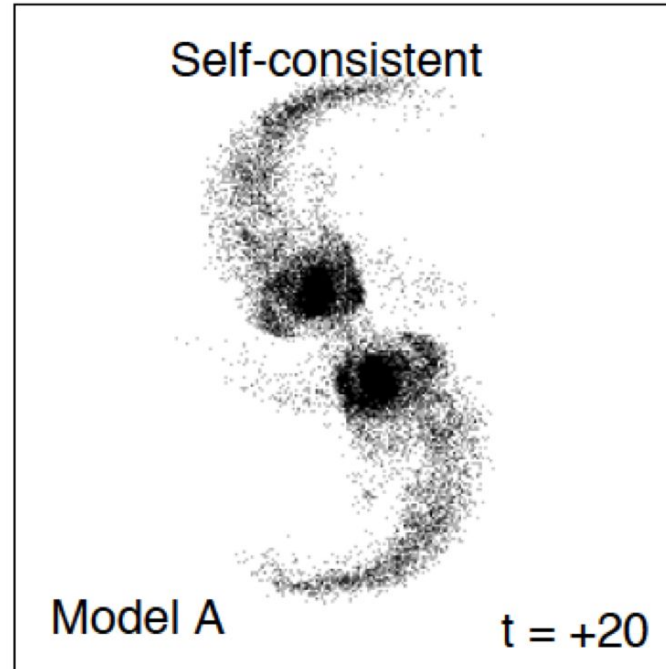
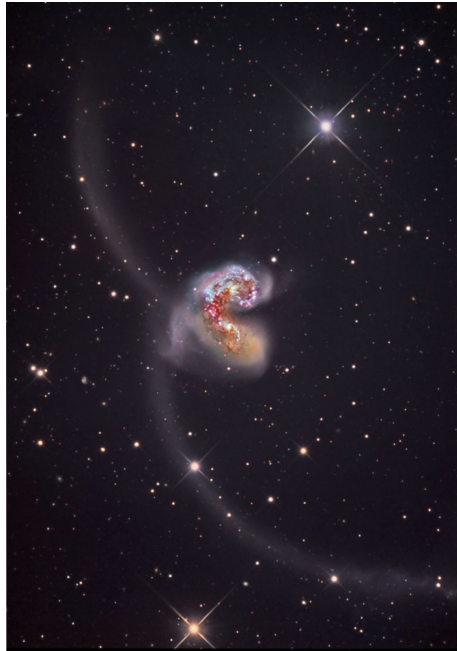
Samuel Boissier, Jin Koda, & Collaborators
(including Junais, Philippe Amram, Benoit Epinat at LAM)

DM properties impact low surface brightness structures

- Imprints of DM often found in low surface brightness structures/galaxies

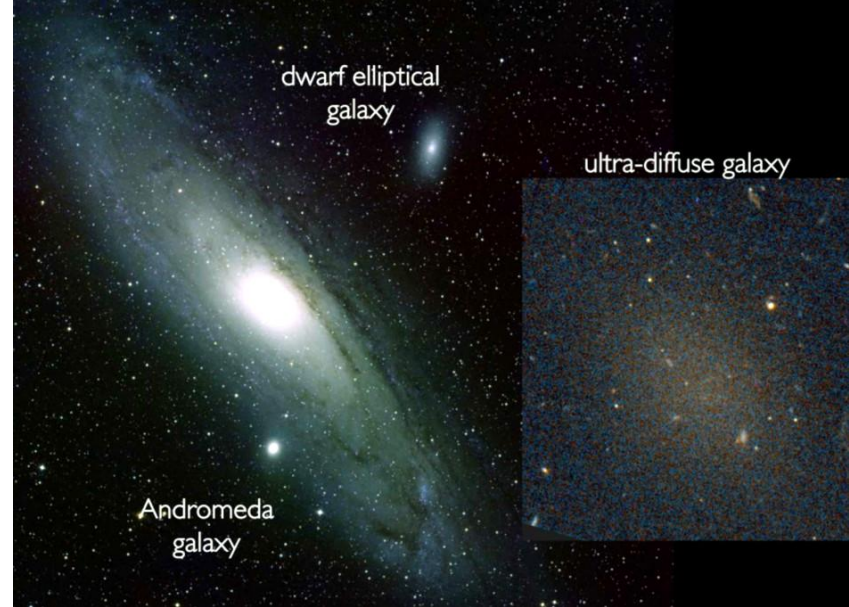
Less Massive DM Halo

Massive DM Halo

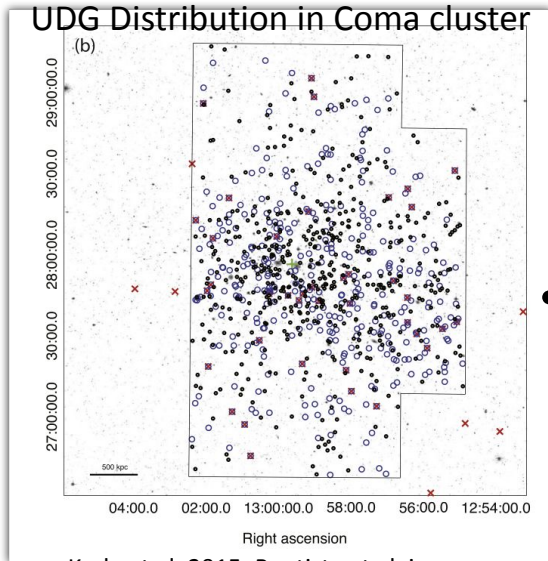


Ultra-Diffuse galaxies (UDGs)

- As large as MW in size, but only $\sim 1/100$ to $1/1,000$ of stellar mass
- **Fragile** against tidal disruption *unless massive DM halos protect them*



Schoening/Harvey/van Dokkum/NASA/ESA Hubble Space Telescope



Koda et al. 2015; Bautista et al. in prep.

- Connections to DM
 - Very abundant and centrally-concentrated in galaxy clusters (strong tidal field) \rightarrow *DM statistics ok?*
 - DM halo masses from GC counts \rightarrow *Massive DM?*

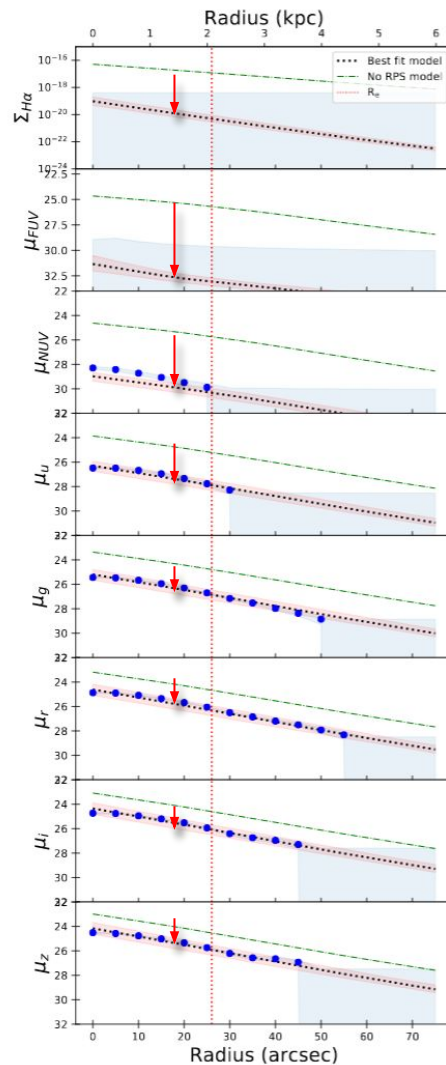
Probing the history of UDG

Junais et al. 2021 ; Junais et al., in preparation

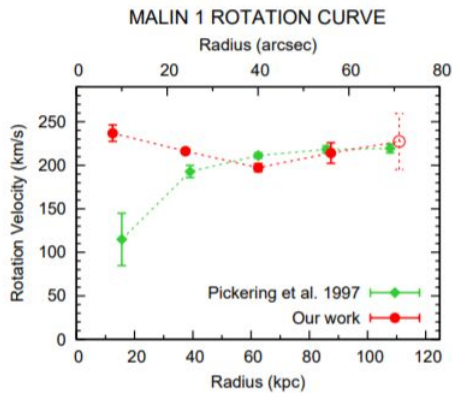
130 “ultra-diffuse galaxies” in the Virgo-Cluster with
multi-wavelength observations

Models including **Ram-Pressure Stripping** (dynamical pressure from the Inter-Cluster Medium on the gas galaxy due to its orbit within the cluster)

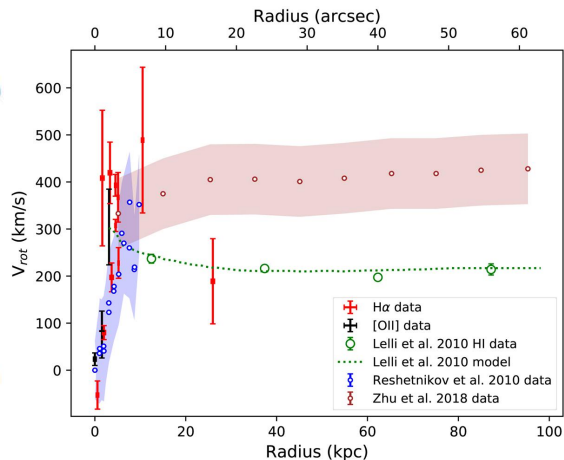
- galaxy DM halo depth and survival
(harder to strip the gas from a dense halo)
- cluster DM halo
(density of the ICM, orbit within the cluster)



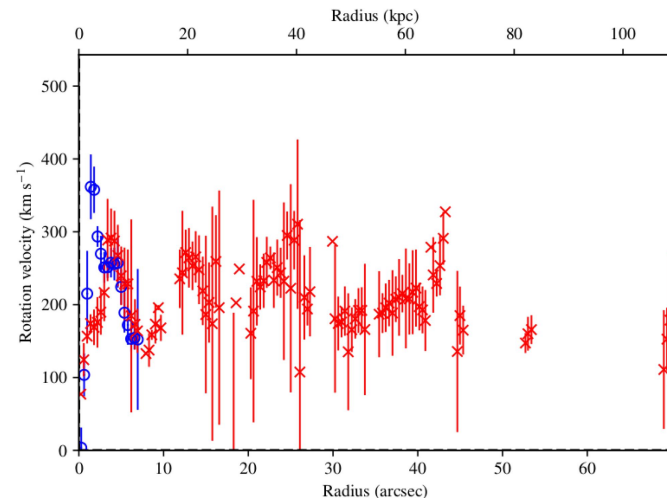
Rotation Curves of Giant LSB



Pickering et al. 1997
Lelli et al. 2010
(HI rotation curve)



Junais et al. 2020
(ionised gas emission line)



MUSE data (PI G. Galaz).
Preliminary analysis by B. Epinat.
NOT YET PUBLIC!

1997

2010

2020

2021

Pickering et al. : the slowly rising rotation curve in giant LSBs may tell us about the inner DM halo

Lelli et al. : the rotation curve is rather flat (at the HI gas resolution)

Junais et al. : in fact, there is a very steep rise (!) with extremely high velocity values. A massive DM halo is still needed.

Very complex RC, confirming Junais et al. results, but also indicating a lot of structure in the DM dominated region.