

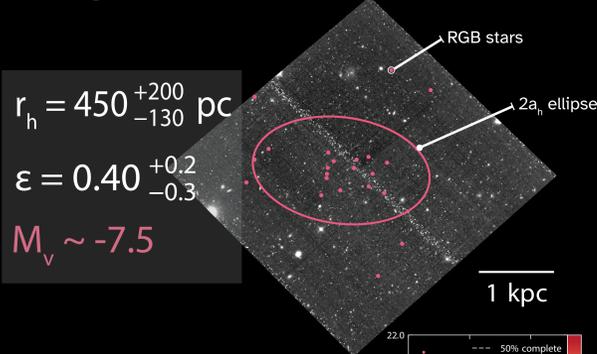
Exploring the Diversity of Ultra-Faint Satellites in the M81 Group

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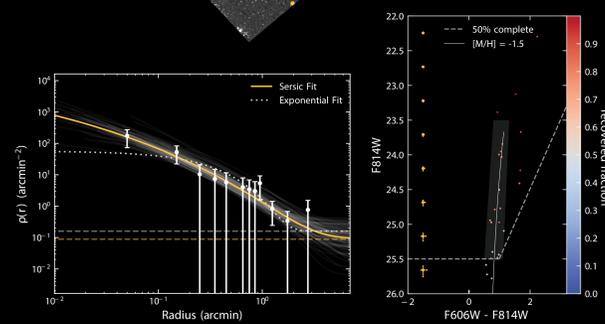
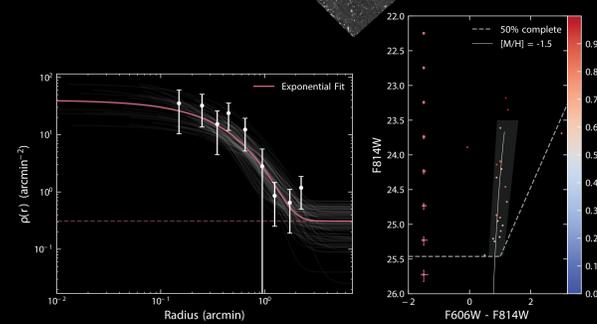
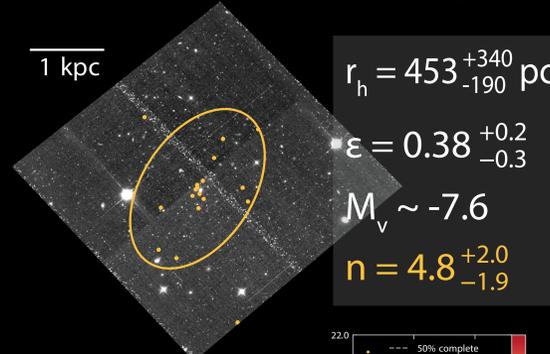
What did we do?

We imaged four M81 ultra-faint dwarf satellites with HST/ACS and derived structural parameters using MCMC profile fitting

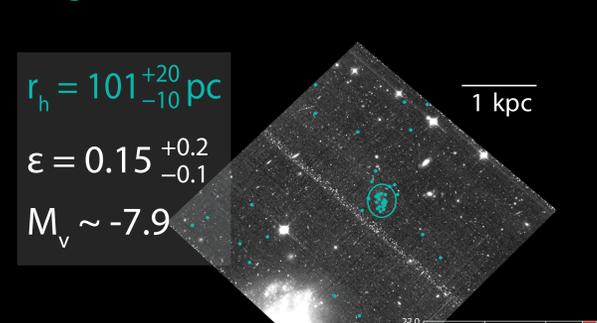
D1005+68: larger + fainter than we thought



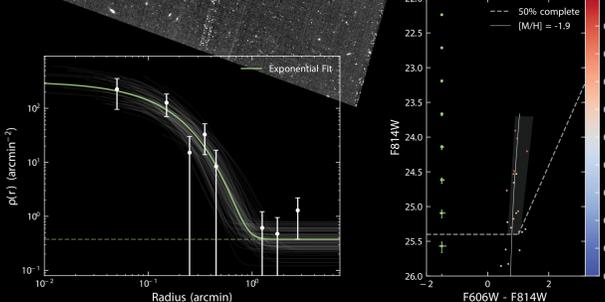
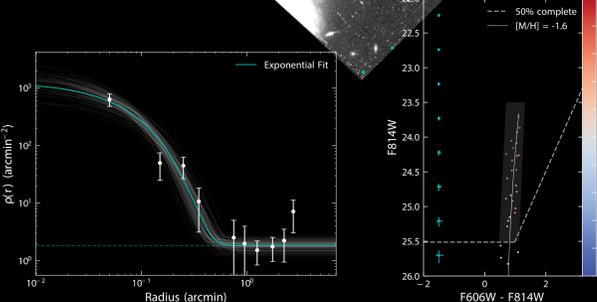
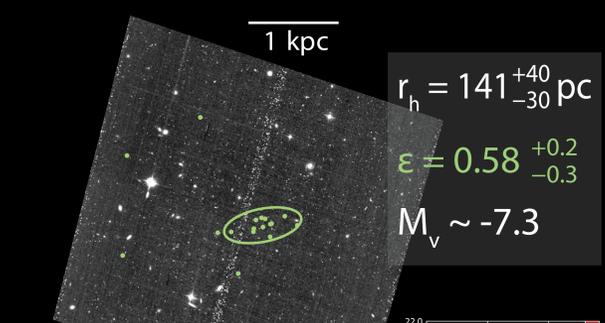
D1006+69: most concentrated (n~5!)



DWJ0954+6821: compact for its magnitude



D1009+68: highly elliptical



What did we learn?

System heterogeneity:

Similar in magnitude, but span an order of magnitude in size and are the faintest M81 satellites ever discovered

Unusual characteristics:

D1006+69 is the only UFD outside the Local Group with an exceptionally high (n~5!) Sérsic index

Space-based follow-up needed:

Derived UFD properties differ by a large margin between ground and space-based data

Tides aren't the only answer:

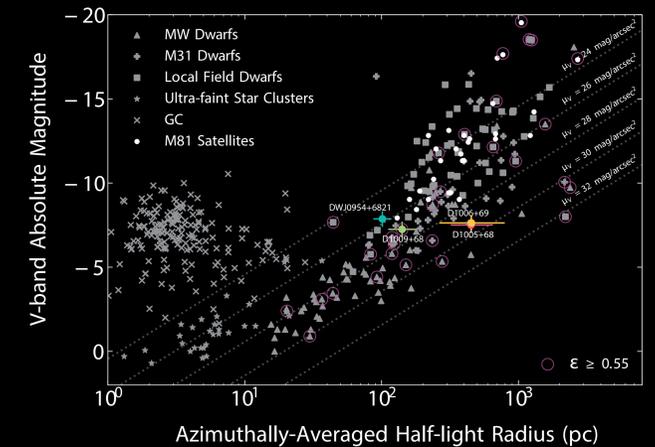
D1009+68 is one of the most elliptical satellites in the local universe, but its tidal ratio doesn't suggest stripping is occurring

Extended envelopes and high ellipticities can be signatures of late dry mergers or tides (Tarumi et al 2021, ApJL, 914, L10; Goater et al 2024, MNRAS, 527, 2)

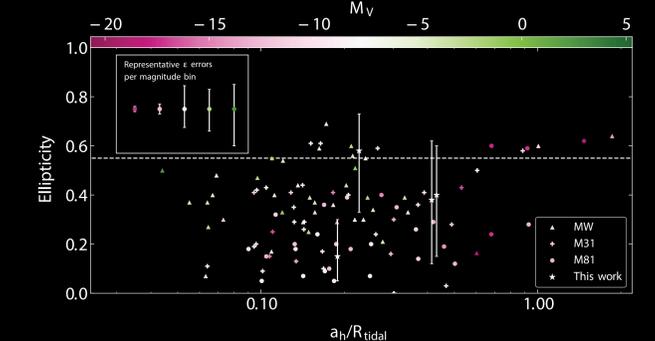
Red and dead:

Despite signs of youth in larger M81 satellites, UFDs are quenched and metal-poor

1 M81 UFD satellites are diverse in their physical properties



2 High ellipticity ≠ tidal stripping!



3 M81 UFD stellar populations are quite uniform

