Testing galaxy formation models with the GHOSTS survey: The stellar halo of M81

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Abstract. The GHOSTS survey is the largest study to date of the resolved stellar populations in the outskirts of disk galaxies (Radburn-Smith *et al.* 2011). The sample currently consists of 16 nearby disk galaxies, whose outer disks and halos are imaged with the Hubble Space Telescope (HST). I will present new results obtained from the study of 19 GHOSTS fields in M81's outermost part. The observed fields probe the stellar halo of M81 out to projected distances of ∼50 kpc, an unprecedented distance for halo studies outside the Local Group. The 50% completeness levels of the color magnitude diagrams are typically at 2.5 mag below the tip of the red giant branch. When considering only fields located at galactocentric radius $R > 15$ kpc, we detect no color gradient in the stellar halo of M81. We compare these results with model predictions for the colors of stellar halos formed purely via accretion of satellite galaxies (Bullock & Johnston 2005). When we analyze the cosmologically motivated models in the same way as the HST data, we find that they predict no color gradient for the stellar halos, in good agreement with the observations (see Fig. 1).

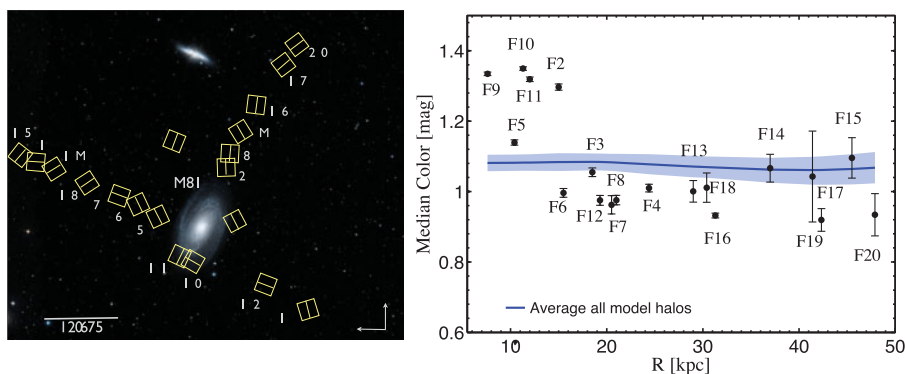**Keywords.** galaxies: halos, galaxies: individual (M81), galaxies: spiral, galaxies: formation

Figure 1. Left panel: Location of the 19 observed HST/ACS GHOSTS fields. Right panel: Median color profile of the M81 observed fields (dots). There is no color gradient for fields at $R > 15.5$ kpc, which we assume here to be M81's halo populations. The solid line shows the average color profile of the halo models analyzed and the shaded area indicates the 1σ model-to-model deviations.

References

Bullock, J. S. & Johnston, K. V., 2005, *ApJ* 635, 931
Radburn-Smith, D. J., *et al.* 2011, *ApJS* 195, 18