



Contribution ID : 14

Type : **Contributed talk**

How Environment Shapes Quiescent Galaxy Stellar Halo Assembly: Insights from Extended Light and Color Profiles

Wednesday, 28 October 2026 13:25 (10)

Galaxies do not grow in isolation. Interactions with neighboring galaxies and material in their surrounding cosmic environments can drive stellar mass assembly and morphological evolution. Galaxy stellar haloes retain signatures of these externally driven processes due to the long dynamical timescales in galaxy outskirts. Observations tracing stellar halo buildup therefore provide a probe of how merger-driven accretion and environmental processing shape galaxy assembly over cosmic time. In this talk, I will present a combined investigation of stellar halo evolution in quiescent galaxies (QGs) across cluster and field environments over $0.1 \leq z \leq 1.0$. Using deep CLAUDS+HSC-SSP multiband imaging, we measure rest-frame g-band light and (U-g) color profiles extending to $10R_e$ for $\sim 90,000$ QGs with $\log(M_\star/M_\odot) \geq 9.66$. We isolate environmental effects by comparing the evolution in median light and color profiles of cluster QGs with those of stellar mass- and redshift-matched field QGs, tracing both the buildup of stellar halo material and the evolution of extended radial color gradients. Our results indicate that high-mass cluster QGs exhibit enhanced stellar halo growth fueled by increased accretion. This accretion likely arises from minor mergers occurring in cluster outskirts or pre-infall groups, which deposit bluer stellar populations (younger and/or lower metallicity stars) into the outskirts of higher-mass cluster QGs. In contrast, low-mass cluster QGs show suppressed stellar halo growth and increased reddening of their outskirts relative to the field. These lower-mass QGs likely lose outer stellar halo material through environmental stripping or accretion by high-mass galaxies during mergers.

Did you give a contributed talk at CASCA 2026?

No

If you are selected for a poster, would you be interested in giving a short flash talk on your work?

Yes

What is your career level?

PhD

Which keyword describes the area of focus of this talk?

Galaxies

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Session Classification : Galaxies