



# Structure and Population of the NGC55 Stellar Halo from a Subaru/Suprime-Cam Survey

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(Submitted on 5 Jul 2011)

As part of our survey of galactic stellar halos, we investigate the structure and stellar populations of the northern outer part of the stellar halo in NGC55, a member galaxy of the Sculptor Group, using deep and wide-field V- and I-band images taken with Subaru/Suprime-Cam. Based on the analysis of the color-magnitude diagrams (CMDs) for red-giant-branch (RGB) stars, we derive a tip of RGB (TRGB)-based distance modulus to the galaxy of  $(m-M)_0 = 26.58 \pm 0.11$  ( $d = 2.1 \pm 0.1$  Mpc). From the stellar density maps, we detect the asymmetrically disturbed, thick disk structure and two metal-poor overdense substructures in the north region of NGC55, which may correspond to merger remnants associated with hierarchical formation of NGC55's halo. In addition, we identify a diffuse metal-poor halo extended out to at least  $z \sim 16$  kpc from the galactic plane. The surface-brightness profiles toward the  $z$ -direction perpendicular to the galactic plane suggest that the stellar density distribution in the northern outer part of NGC55 is described by a locally isothermal disk at  $z < \sim 6$  kpc and a likely diffuse metal-poor halo with V-band surface brightness of  $\mu_V \gtrsim 32$  mag arcsec<sup>-2</sup>, where old RGB stars dominate. We derive the metallicity distributions (MDs) of these structures on the basis of the photometric comparison of RGB stars with the theoretical stellar evolutionary models. The MDs of the thick disk structures show the peak and mean metallicity of  $[\text{Fe}/\text{H}]_{\text{peak}} \sim -1.4$  and  $[\text{Fe}/\text{H}]_{\text{mean}} \sim -1.7$ , respectively, while the outer substructures show more metal-poor features than the thick disk structure. Combined with the current results with our previous study for M31's halo, we discuss the possible difference in the formation process of stellar halos among different Hubble types.

Comments: 11 pages, 11 figures, 2 tables. Accepted for publication in ApJ

Subjects: **Galaxy Astrophysics (astro-ph.GA)**; Cosmology and Extragalactic Astrophysics (astro-ph.CO)

DOI: [10.1088/0004-637X/738/2/150](https://doi.org/10.1088/0004-637X/738/2/150)

Cite as: [arXiv:1107.0911](https://arxiv.org/abs/1107.0911) [astro-ph.GA]

(or [arXiv:1107.0911v1](https://arxiv.org/abs/1107.0911v1) [astro-ph.GA] for this version)

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