The General Assembly of Galaxy Halos: Structure, Origin and Evolution
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Imaging of NGC 5907's stellar stream

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Abstract. We have obtained deep g, r, and i-band Subaru and ultra-deep 3.6 μm IRAC images of parts of the multiply-wrapped stellar stream around the nearby edge-on galaxy NGC 5907. We have fitted the surface brightness measurements of the stream with FSPS stellar population synthesis models to derive the metallicity and age of the brightest parts of the stream. The resulting relatively high metallicity ([Fe/H] $= -0.3$) is consistent with a major merger scenario but a satellite accretion event cannot be ruled out.

Keywords. galaxies: evolution, galaxies: halos, galaxies: individual (NGC 5907), galaxies: interactions, galaxies: structure

1. Introduction

The detection of stellar streams around nearby galaxies (e.g., Martínez–Delgado *et al.* 2008, 2009, 2010) provides unequivocal evidence of galaxy accretion events. These features reveal the mechanism e.g. for the hierarchical growth of galaxy halos. However, little is known about the progenitors of stellar streams, including their mass and metallicity. While most of the evidence of minor interactions has come from observations of the Milky Way and M31, nearby galaxies outside the Local Group provide even more spectacular evidence of such galaxy disruption events. In this contribution we examine the multiply-wrapped stellar stream around the nearby ($D \approx 17$ Mpc) edge-on disk galaxy NGC 5907 with visible light and near-infrared observations.

2. Observations, Data Reduction and Results

NGC 5907 was observed with Subaru's Suprime-Cam imager in g-, r-, and i-bands, and with Spitzer's IRAC camera at 3.6 μm. We used an iterative scheme to subtract the background light in Subaru images. We ran the IRAC data through Fixen self-calibration (Fixen *et al.* 2000) and through one iteration of the GOODS pipeline (Grumm *et al.* 2005) artifact mitigation and then mosaicked the frames. We masked the foreground and background sources by hand before measuring the surface brightness along the brightest part of the stream. We fitted the surface brightnesses with FSPS SED models from Conroy *et al.* (2009) and Conroy & Gunn (2010). The best fit (metallicity

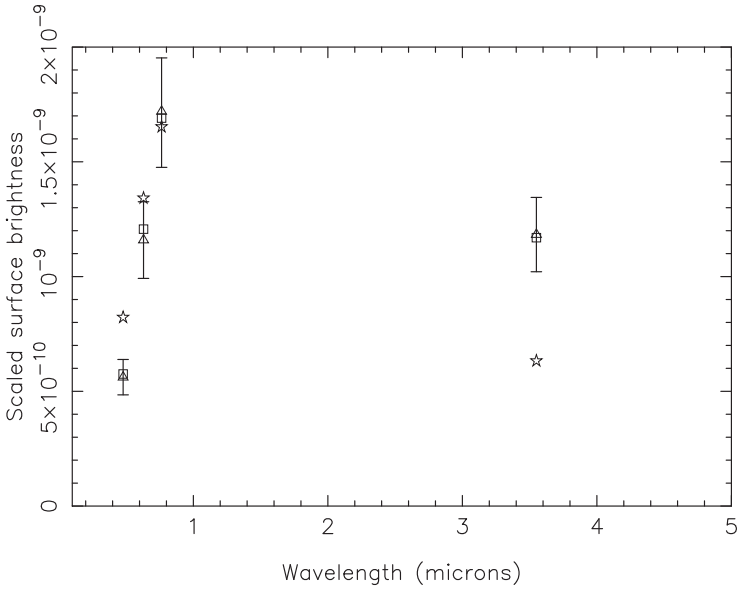

Figure 1. Observations (triangles), best-fit model (squares) and a low metallicity model (stars) in the brightest part of the stellar stream of NGC 5907.

[Fe/H] = −0.3, age = 14.96 Gyrs) is shown in Figure 1 where we also show a model with a low metallicity ([Fe/H] = −1.98, age = 9.44 Gyrs).

Martínez–Delgado *et al.* (2008) modeled the stellar stream with a satellite companion having a stellar mass of ≈ 3.5× 10^8 $M_\odot$. In contrast, Wang *et al.* (2012) modeled the stream with a major merger (mass ratio 1:3 – 1:12). While our relatively high metallicity value suggests a major merger origin of the stream, it is possible that the metallicity is consistent with a satellite accretion event such as the Sagittarius Stream (Chou *et al.* 2007) or the giant stream in M31 (Kalirai *et al.* 2006). This work is based in part on observations made with the Spitzer Space Telescope, operated by JPL/Caltech under a contract with NASA and with the Subaru Telescope, operated by NAOJ. Support for this work was provided by NASA through an award issued by JPL/Caltech.

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