Recent Star Formation in Local Group Galaxies from HST Imaging

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Abstract

We present results from an ongoing study of stellar populations in the Local Group galaxies M31 and NGC6822 from multiwavelength imaging obtained with several HST programs. The HST program is a follow-up of a two-dimensional, HST imaging of the resolved stellar population. The stellar photometry is obtained by comparing the observed images with model magnetohydrodynamics. We present two different methods and sample programs. Our ongoing programs include similar studies in the LMC and M31.

This study of the resolved stellar population is complemented by UV surveys of young galaxies in their proximity, performed with GALEX in the Hubble Space Telescope, and with a variety of color-magnitude data in the optical and UV (see papers by Blaizot et al. 1999, “Recent Star Formation in Local Group Galaxies from the GALEX survey”, and by Pilleri, Huchal et al.)

In the past few years, Local Group galaxies have received much attention due to their role in understanding the formation and evolution of the universe. However, it is not clear how many of these massive galaxies have been in the process of star formation. The results from these past few years point to a key in understanding the properties of these galaxies and the history of star formation in the universe.

We observed a large number of field stars using the Hubble Space Telescope (HST) and its Wide Field Planetary Camera 2 (WFPC2). We used a grid of models to determine the stellar mass functions and to calculate the fraction of young stars in each galaxy. The results from these past few years confirm the dominance of the young stellar population in the Local Group galaxies.

Introduction

The young stars of a stellar population are those that were born within the last few hundred million years. The young stellar population can be characterized by the fraction of young stars relative to the total stellar mass. This fraction, which is called the young stellar population fraction (YSFP), is an important parameter in understanding the history of star formation in the universe.

The YSFP is defined as the ratio of the number of stars formed in the last few hundred million years to the total number of stars in the galaxy. The YSFP can be used to infer the rate of star formation in the universe. As the YSFP increases, the rate of star formation also increases. The YSFP is also a useful parameter in understanding the properties of the young stellar population.

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Figure 1. The location of the field stars observed with the HST WFPC2 in the galaxy M31. The field stars are shown as blue circles. The young stars are shown as red circles. The young stars are those that were born within the last few hundred million years. The young stars are the most massive stars and are the most luminous. The young stars are the most massive stars and are the most luminous. The young stars are the most massive stars and are the most luminous.