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STELLAR POPULATIONS IN INTERACTING SYSTEMS OF THE SECOND BYURAKAN SURVEY

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We have started an observing program to study the whole sample of interaction systems from the Second Byurakan Survey (SBS) (around 20 sky fields) using a CCD camera and the B, R, and Hα filters[2]. The objectives of this project are: (1) to link the histories of the star formation and nuclear activity in these systems with the morphologic type of the interacting galaxies; (2) to settle upper limits to the age of the induced starbursts using the Hα images, which relates with the dynamical time of the interaction; (3) to infer the masses of the stars which are crucial for understanding the physical properties of the perturbed interstellar medium.

Introduction

It is well established that the mass distribution in each component of an interacting system of galaxies, and the connection between the timescales of the dynamical interaction and the starburst phenomenon, are important factors to understand the result of the interaction. The interactions may induce starbursts, structures such as bars, rings, bridges and tails, and possibly AGN activity (Kennicutt, Roettiger, Keel et al. 1987). Recent numerical models (Mihos & Hernquist 1996, Leitherer 1999) and optical broad band and Hα observations (Barton, Geller & Keyton 2000) suggest that close encounters can induce starbursts. However, Krongold, Dultzin-Hacyan & Marziani (2002) also suggest that more distant interactions can trigger AGN activity.

B, R, and Hα images are necessary to infer the star population and the stellar formation rate in the interaction-induced starbursts. Thus, we will determine the stellar formation histories and ages for each galaxy. The star formation rate and the stellar masses will yield an upper limit estimate for the starburst age. As part of our observations, we present preliminary results for two of the systems that we have already observed. We follow the procedure described in Franco-Balderas, Hernández-Toledo, Dultzin-Hacyan & García-Ruiz (2003).

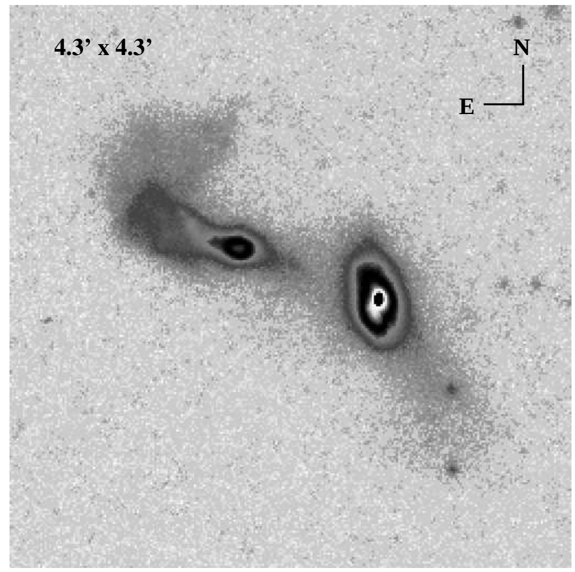

Fig. 1. B-band image of SBS1241+551 AB.

SBS 1241+551 AB

We found scarce information in NED relevant for the present work about SBS1241+551. Our experience in this kind of pairs (Franco-Balderas et al. 2003) suggest that this is a system with a common luminous halo and an amorphous asymmetric structure visible in our B and R images. Karachentsev (1972) classifies this system as a mixed pair, which it is not evident in our study. We have found that both components are very perturbed (Fig.1). A spiral structure for the north component was originally suggested by Karatchentsev (1972), but from our B and R images we could not see this structure in any of the galaxies. Rather, we see a low surface brightness tidal tail, and also a tenuous bridge between the two galaxies, that can be interpreted as a late interaction stage between them. Notice that, the south component of the system shows a complex internal structure. From our Hα images, we found in-

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[2]Images were obtained at San Pedro Mártir Observatory (SPM) with the 1.5 m telescope and the 1024 x 1024 SI003 CCD.

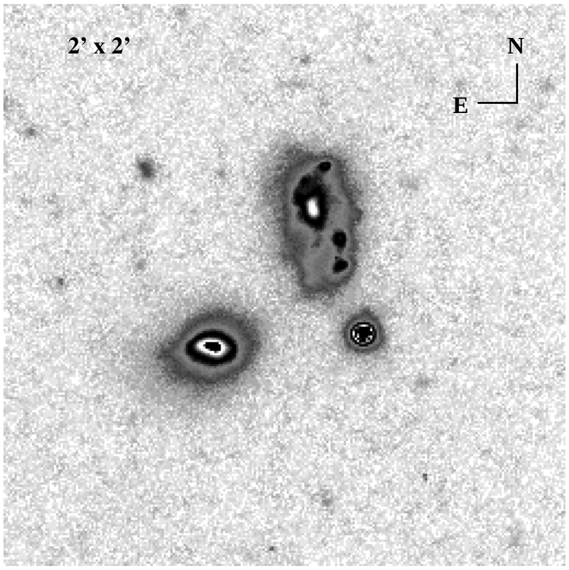

Fig. 2. B-band image of SBS 1317+523 AB.

tense emission from its nuclear region, with at least two sources of different intensity. From our optical study, we can see that this galaxy posses two nuclei and shows a disrupted appearance.

SBS 1317+523 AB

This system again has not been studied before, so this the first attempt for characterize its morphology and star formation evolution. This is a system with a complex morphology (Fig.2). The northern component is a disrupted spiral galaxy with a prominent outer star formation ring, and a bright knot clearly seen in our Hα image. The southern component has been known as an Blue Compact Dwarf Galaxy (see NED). In our images it is not evident that this galaxy has an elliptical morphology, and what we can see is that the galaxy is perturbed, although it does not show any evidence of tidal tails, no bridges, no plumes or bars. The Hα emission from this object reveals little star formation in the nucleus, that can be attributed to gas that was striped from its companion. Surprisingly, we do not observe a common halo in this system.

Future Work

Optical photometry and spectroscopy are planned for the complete sample of SBS interacting systems. This observations are planned with the 2.1m telescope in SPM, including CCD imaging, Hα and high resolution (3D spectroscopy) with the PUMA instrument, which is a Fabry Perot attached to this telescope. Spectroscopic follow-up will be performed to study the chemical abundances for all the SBS interacting systems. This information, along with an appropriate model for stellar population synthesis, will produce a better estimate for the mass of the starbursts. The spectroscopic data will also be used to study the dynamical properties and the large scale redistribution of the gas and the AGN activity.

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