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Interaction between galaxies, the impact on their physical properties

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Here we present a study of the physical properties and nuclear activity of the new detected interacting galaxy selected from the Arp & Madore Catalog. The data were obtained using the GMOS-S spectrograph at the Gemini-South telescope with spectral coverage from 350nm to beyond 800nm (rest wavelength) and with spectral resolution enough to separate the [NII] +H α blend. The slit was aligned to include both (or two of the) galaxies, and to improve sky subtraction.

In order to determine the physical condition of the ionized gas and the nuclear activity of each galaxy, a central 2kpc spectrum, free from stellar population contribution, was obtained.

The redshift was measured using IRAF tasks rvidlines and xcor, for emission and absorption spectra, respectively , adopting $H= 75 \text{ km/sec Mpc}$. In order to determine if the galaxies form a physical system, we constraints the difference between their radial velocities in $\Delta V < 500 \text{ km/sec}$.

We found that 81 of the 107 observed galaxies are real physical systems. The same procedure was used to built a pure emission line spectrum of a isolated control sample galaxies. These galaxies were selected from SDSS survey, which the r' magnitude, redshifts and morphology are similar to the pair members. For all galaxies, of both samples (physical pairs and isolated) the emission lines were identified and their fluxes were measured. The lines fluxes were corrected by dust extinction according Osterbrock (1989). Special care was taken with errors propagations. Once the intensity of the emission line spectrum is sensible to radiation field, electron density and temperature, one can use diagnostic diagrams (BPT, Baldwin, Phillips and Terlevich, 1981) to classify the sources according to their nuclear activity (Seyferts, LINERs, Starburst, and composite spectrum - wich may indicate the presence a weak AGN component). We built several diagnostic diagrams with the emission line ratios: [OIII] 5007 Å / H β 4861 Å vs [NII] 6584 Å / H α 6563 Å , [OIII] 5007 Å / H β 4861 Å vs [SII] 6717,6730 Å / H α 6563 Å , [OIII] 5007 Å / H β 4861 Å vs [OI] 6300 Å / H α 6563 Å and [OIII] 5007 Å / [OII] 3727 Å vs [OI] 6300 Å / H α 6563 Å. The theoretical and empirical divisions curves of Kewley et. al. 2001 and Kauffman et. al. 2003 and 2006 were used. From this diagrams it was possible to conclude that the fraction of galaxies of different activity types is not the same for both samples. We found 60% of the physical pairs have a composite spectrum and similar fraction (20%) are SB or AGN. While for isolated galaxies 30% are composite, 50% are SB, and 20% are AGN.