Multi-Object Spectroscopy in the Next Decade: Big Questions, Large Surveys and Wide Fields
Santa Cruz de La Palma, Canary Islands 2-6 March 2015

Automatic spectral classification of galaxies in the IR

Silvana G. Navarro Jiménez[1], Violeta Guzmán Jiménez[2], José Carlos Dafonte Vázquez[3], Alejandra M. Rodríguez Fernández[3] Luis J. Corral Escobedo[1]

[1] *Instituto de Astronomía y Meteorología (IAM), Universidad de Guadalajara, México*
[2] *Preparatoria Jalisco, Universidad de Guadalajara, México*
[3] *Departamento de Ciencias de la Computacin e Inteligencia Artificial, Universidade da Coruña*

Abstract

Multi object spectroscopy (MOS) provide us with numerous spectral data, and the projected new facilities and survey missions will increment the available spectra from stars and galaxies. In order to better understand these huge amount of data we need to develop new techniques of analysis and classification. Over the past decades it has been demonstrated that artificial neural networks are excellent tools for automatic spectral classification and identification, being robust tools and highly resistant to the presence of noise.

We present the result of the application of unsupervised neural networks (UNN) and self organized maps (SOM) to a sample of 747 galaxy spectra from the Infrared Spectrograph (IRS) of Spitzer. All were obtained from the central part of the galaxies. The redshift (z) of the sample galaxies is between 0.0001 and 0.3. All of them are high resolution spectra (R$\sim$600) obtained using the Short-High (9.9-19.6 μm) and Long-High (18.7-37.2μm) modules of IRS. We obtained an automatic classification on 17 groups with the UNN, and we compare the results with those obtained with SOMs.

The final goal of the project is to develop an automatic spectral classification tool for galaxies in the infrared, making use of artificial neural networks with unsupervised training, obtaining the spectral characteristics of the galaxies which will give us clues to the physical processes taking place inside them.