Z112a   Application of Machine Learning Classification Methods to the Study of Galaxy Evolution

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The majority of star-forming galaxies follow a relatively tight relation between stellar mass and star formation rate (SFR) in a wide range of redshifts. This is known as the star-forming galaxy main sequence (SFMS).

In this work, We try applying machine learning algorithms to the analysis of SFMS based on the CANDELS GOODS-S multi-wavelength photometric catalogue (Guo et al. 2013) with 17 wavebands from ultraviolet to mid-infrared wavelengths, with the addition of observations in the mid- and far- IR band with Spitzer and Herschel. We also used the `LePhare` code (Ilbert et al. 2006) to obtain the photometric redshifts, star formation rates (SFR), and the stellar mass of each galaxy.

The star formation process in galaxies is very complicated, and thus can involve rather high-dimensional data. We try to find the inner pattern and structures in the data with t-SNE and other algorithms. We try to use the statistical methods to analyze the traditional SFMS, as well as to classify galaxy populations on the SFR–M_*–z plane, and determine the number of subclasses. In this talk, we present these results.