Star Formation Histories and chemical enrichment using Neural Networks.

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Abstract

We present spatially resolved Star Formation Histories and metallicity evolution on nearby galaxies. We use Convolutional Neural Networks with a combination of MUSE optical spectroscopy and HST photometry in the UV range. Combined with the high-resolution CO emission information, this analysis will allow inferring the timescales for star formation and cloud destruction in different galaxy environments, providing clues about the dominant mechanisms of stellar feedback.

The Convolutional Neural Network has been trained with simulated spectra, generated based on observational data from the PHANGS catalogue. One of the main challenges of this work resides in the degeneracy in the resulting spectra as a result of combinations of Star Formation History and Metallicity. To break this degeneracy, Ultraviolet photometric observations from HST are added to the neural network's input. This additional information allows the Convolutional Neural Network to improve the prediction and distinguish between different Star Formation Histories and Metallicities. The outputs are weighted favouring younger star formation, as these are the star formation histories we are interested in using further on.

My poster is available at https://zenodo.org/record/7047433#.Y8Ery-zMLCV