Unsupervised classification of galaxies: interpreting the high-dimension

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Going unsupervised is a necessary step for data-driven and automated classifications, but this is clearly a patient and difficult approach. The high-dimensionality of data such as spectra or images of galaxies requires a representation space of lower dimension, and classification is a way to simplify the description of the object diversity. The question then arises of what is known as the interpretability of Machine Learning. In other words how can we confront the clusters found in a non-physical sub-space to physical models that are more suited to the limitations of the human brain? How can we name and describe the classes found by the algorithm? In this talk I will illustrate these problematics through our work on the unsupervised classification of galaxies with the discriminant latent subspace mixture-model based algorithm called Fisher-EM.