

CoCo 2o2o: Cosmology in Colombia



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From the β -skeleton to the Cosmic Web elements

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The spatial distribution of galaxies on large scales forms a striking filamentary pattern known as the cosmic web. Measuring and characterizing this pattern is one of the main goals in cosmology. There are algorithms that can perform this task using the full dark matter distribution as an input. However, in observations, the dark matter distribution is not observable. To bypass this limitation there are other types of algorithms that build a graph on top of an observed 3-dimensional galaxy distribution to roughly quantify the cosmic web patterns.

In this talk, I will show a Machine Learning-based approach that can link these two types of algorithms and help us to infer the dark matter cosmic web from observed galaxies. I use state-of-the-art cosmological simulations from the Illustris-TNG project as a training data-set.

I will present results for our cosmic web reconstruction methods and comment on its possible application on observational data from the Dark Energy Spectroscopic Instrument (DESI).

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