

# Extragalactic Universe: Star formation activity of galaxies

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Star formation is one of the main mechanisms of energy production in the universe and one of the essential processes linked to galaxies' evolution. Over the past two decades, we have witnessed an explosion of data from local and distant galaxies across the entire electromagnetic spectrum. These observations gave us an unprecedented picture of those objects (e.g. gas content, physical conditions in the interstellar medium, and dynamical state of galaxies) and their evolution over cosmic time. But the main problem of proper and homogeneous estimation of the star formation rate (SFR) is still open.

The common denominator in all these studies is the use of diverse techniques for quantifying the recent star-forming activity in different environments. This talk aims to introduce the methods used to measure the intensity of star-forming activity in galaxies (their star-formation rates), focusing on spectral energy distribution (SED) fitting methods and star formation rate evaluation from the galaxy X-ray emission. In this context, I will discuss my PhD project, dividing it into three parts: 1) Is it possible to estimate proper SFR for normal star-forming galaxies for the upcoming optical Legacy Survey of Space and Time (LSST) data from the Vera C. Rubin Observatory? 2) How does the emission from low-mass X-ray binaries contribute to galaxies' total X-ray emission, and how does it influence the SFR measurement? 3) How the X-ray emission modeling can help us probe the X-ray luminosity-SFR scaling relation

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