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**TITLE:** COSMOLOGICAL EVOLUTION OF THE PHYSICAL PROPERTIES OF GALAXIES

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**SUMMARY:**

The study of galaxy formation and evolution is one of today's hottest topics. Two large surveys (2dFGRS, SDSS), bearing on several million local galaxies, recently allowed important statements in the comprehension of the physical properties of galaxies. In addition, new 8-10m diameter telescopes, equipped with multi-objects spectrographs (VLT/VIMOS, Keck/DEIMOS, Gemini/GMOS, ...), have given the opportunity to start new large surveys dedicated on distant galaxies (VVDS, DEEP2, GDDS, zCOSMOS, ...), therefore located in a younger universe.

This thesis work preferentially concerns the study of the mass-metallicity or luminosity-metallicity relations, which are able to establish a bond between the two major processes responsible for the evolution of galaxies: stellar mass assembly (star formation or merging processes) and the chemical enrichment of the interstellar medium by successive generations of stars. We show that the shape of this relation is a very good way to test the models of galaxy formation and evolution. We study the reference of the luminosity-metallicity relation, obtained in the local universe with the 2dFGRS survey. Then we study the evolution, as a function of universe age, of the luminosity-metallicity relation using a small sample (LCL05), and the mass-metallicity relation using the VVDS large survey. Several results obtained with these various samples are evidences in favour of the hierarchical model: the most massive galaxies would be formed by progressive merging of smaller galaxies.

The physical properties of a large number of galaxies are estimated using automatic tools specifically developed, or adapted to our needs, during this thesis. As additional results, new calibrations of the spectral classification or the star formation rate of galaxies are obtained with the local universe large surveys (respectively 2dFGRS and SDSS). This work offers many possibilities for new results thanks to the amount of available data and its diversity.

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**KEYWORDS:** Galaxy evolution, galaxy formation, spectroscopy, photometry, large surveys (2dFGRS, SDSS, VVDS), automatic tools, spectral classification, mass-metallicity relation, star formation rate.