

Thesis Proposal:
**A Connection Between Star Formation Rate and
Dark Matter Halos at $Z \sim 6$ In 2013 Planck Cosmology**

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Abstract

During the last century astrophysics and cosmology have evolved rapidly due to theoretical and observational developments. Technology allows us have to a glance of the universe farther and farther with ground and space telescopes. Our conception of the universe has changed from a static universe to a dynamic one originating from the Big Bang.

Many models exist for trying to explain the universe and its evolution. The most accepted one is the λ -CDM model, which has three components: Baryonic matter (4%), Dark Matter (26%) and Dark Energy (70%).

Baryonic matter is mainly constituted by atomic nuclei and electrons, that is what we call matter in our daily experience. Dark matter on the other hand, refers to that component of the universe which interacts with baryonic matter through gravity while not having electromagnetic interaction. It is not possible to detect it directly. Dark energy is the component associated to the accelerated expansion of the universe and the vacuum energy. There is not agreement between cosmology and quantum mechanics to explain its magnitude.

Understanding dark matter would mean to understand beyond the 4% of the studied universe. Dark matter space distribution is directly related to baryonic matter distribution. It seems to be that each galaxy is surrounded by a Dark Matter Halo (DMH), Milky Way inclusive. Dark matter is present in the whole universe, it forms large scale structures clustering galaxies. To understand dark matter, important cosmic simulations have been developed as laboratories to test cosmic models.

Recent observations have detected distant galaxies (at redshift $z \sim 6$ and farther away), when the universe was only 10% of its current age. To study galaxy forming processes would lead us to understand not only other galaxies

but ours as well.

This work aims to find the relationship between baryonic matter and dark matter at high redshift. We have DMHs catalog from simulations at $z = 5.9$. We will suppose that each DMH hosts a galaxy. We will assign luminosity and stellar formation rates by implementing a mathematical model as function of host DMH mass. The model will be adjusted to observational data using Markov Chain Monte Carlo Method. We expect to find different Galaxy Luminosity Functions due to cosmic variance.

Subject headings: Dark Matter, Star Formation Rate, High Redshift Galaxies.

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