## **Cosmology 2023 in Miramare**



Contribution ID: 113

Type: not specified

## Investigating the dark side of the universe with the motion of galaxies

Tuesday 29 August 2023 15:25 (25 minutes)

The concordance model of the universe –Lambda Cold Dark Matter (LCDM) model has enjoyed a streak of success in the last twenty years. However, there is still no consensus solution to the mysterious dark matter and dark energy. Furthermore, the measurements of Hubble constant and amplitude of matter fluctuation ( $\sigma_8$ ) from early universe are in tension with the measurements from the late universe. Consequently, various alternative models have been proposed and one of the most popular one is modified theories of gravity. In this talk, I will explain how to use the motion of galaxies (peculiar velocity) to constrain the strength of gravity which determined by the growth rate of structure parameter, and hence distinguish different models of gravity. I will also explain the new model I developed to constrain the growth rate of structure. I will then show my measurement with the largest and deepest peculiar velocity survey to date –the SDSS peculiar velocity survey. The combination of this dataset with my new model for the relationship between growth rate and galaxy velocity significantly reduces the systematic uncertainty in our final constraints. I will end by discussing the consistency of my measurements with others in the literature and the predictions of General Relativity, and prospects for the future (You can find the paper associated with this talk here https://arxiv.org/abs/2209.04166).

Presenter: LAI, Yan Session Classification: Parallel