
Thesis subject

Name of the laboratory: LAM

Thesis advisor: Marceau Limousin

Email and address: marceau.limousin@lam.fr

Tel: 04 91 05 6903

Co-advisor: Eric Jullo

Subject's title: Strong Lensing Cosmography with Euclid and eBOSS Spectroscopy

Subject description:

Several cosmological probes are used to distinguish different cosmological models. Among them, strong lenses by massive galaxies appear to be very powerful (Collett et al., 2015). It provides orthogonal constraints to other probes, which makes it possible to distinguish cosmological models. In order to increase efficiency, redshifts must be measured for both the massive galaxy and the source. The objective of this thesis is to study the sensitivity of Euclid to the constraint of cosmological parameters with strong lenses that will be detected. In the second part of the thesis, the student will apply the method to the existing data of the eBOSS spectroscopic survey.

In a first part of the thesis, the student will produce images and simulated spectra of the strong lenses observed with Euclid and with existing ground observations. Then, he / she will design a tool that will allow to combine the detections of arcs to constrain the cosmological models.

Bibliography:

Brownstein, Bolton, Adam, et al., 2012, "The BOSS Emission-Line Lens Survey (BELLS). I: A Large Spectroscopically Selected Sample of Lens Galaxies at Redshift $z \sim 0.5$ ", *ApJ*, 744, 41
Collett, 2015, "The population of Galaxy-Galaxy strong lenses in Forthcoming optical imaging surveys", *ApJ*, 811, 20
Dawson K, (with Jullo) et al., 2016, "The SDSS-IV Extended Baryon Oscillation Spectroscopic Survey :Overview and Early Data", *AJ*, 151, 44
McCully, Keeton, Wong et al., 2016, "Quantifying Environmental and Line-of-Sight Effects in Models of Strong Gravitational Lens Systems", arxiv:160105417

McCully, Keeton, Wong et al., 2014, "A new hybrid framework to efficiently model line of sight to gravitational lenses", MNRAS, 443, 3631

Jullo, Natarajan, Kneib, D'Aloisio, Limousin, Richard, Schimd, 2010, "Cosmological Constraints from Strong Gravitational Lensing in Clusters of Galaxies", Science, 329, 924