Project Title: Effects of observational systematics on cosmological parameters determination in Euclid

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Project Description:

The Astronomical Observatory of Trieste and the University of Trieste are deeply involved in the preparation for the mission and the development of the data analysis pipelines.

One specific line of work is focused on the exploitation of the spectroscopic galaxy sample and the analysis of clustering properties of galaxies at large scales. Codes providing measurements of the galaxy power spectrum or 2-point correlation function, the main observables in large-scale structure studies, are being developed here, along with the implementation of theoretical models for their interpretation. Another crucial effort carried out here is the assessment and correction of observational systematic errors. The proposed thesis will be the essential link between these two aspects of the preparation for the data analysis, making sure that the expected constraints on cosmological models withstand the test of realistic observations.

The thesis will be developed under the supervision of Dr. Emiliano Sefusatti, lead of the Higher Order Correlation Functions work package (WP) and member of Nonlinear Modelling WP, in co-tutoring with Prof. Pierluigi Monaco, lead of the Observational Systematics WP and of the Galaxy Clustering Simulations WP, all part of the Euclid Galaxy Clustering and Cosmological Simulations Science Working Groups. The candidate will work in close collaboration with a local group of students and postdocs at the University, the Observatory and SISSA and will be part of teams encompassing several Euclid groups in Italy and Europe.

The work will be, for the most part, of numerical nature, but with

the possibility of exploring new analytical tools. More in general, it will expose the student to a variety of topics in the study of the Large-Scale Structure of the Universe, from the estimation of correlation functions from galaxy catalogues to their, state-of-the-art, theoretical modelling from Cosmological Perturbation Theory.

At the end of the PhD program, the candite will have built up all necessary expertise to provide an important contribution to the actual data analysis of Euclid or other competing galaxy surveys lead by international collaborations like DESI or Nancy Grace Roman Space Telescope and to extend their data analysis to test interesting cosmological models following the latest theoretical proposals.