



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DIPARTIMENTO DI FISICA E ASTRONOMIA
Department of Physics and Astronomy - DIFA

PhD project in ASTROPHYSICS

Title of the Project: Detection and properties of young exoplanets using the VLT

Supervisor : Leonardo Testi

Co-Supervisors : Veronica Roccatagliata

Scientific Case: In the last decades we have witnessed the discovery and characterization of the diversity of exoplanetary systems. Exosystems show a broad variety of planetary architectures, and it is yet very unclear how common are planetary systems with characteristics similar to our own Solar System. One of the most fascinating goals of modern astrophysics is thus to understand the genesis of our Solar System in the broader context of planet formation. The ECOGAL collaboration combines the modeling and observational efforts of four main research institutes across Europe to address this problem. ECOGAL researchers are engaged in a multi faceted approach aimed at understanding the different conditions for planet formation throughout the Galaxy. The ECOGAL approach is based on the detailed comparison between numerical simulation and observations from the full Galaxy scale to that of individual planet forming disks. The approach is designed to allow us to trace properties of newly forming stars and planetary systems to the characteristics of the environment where they originate. The University of Bologna contribution focuses primarily on constraining observationally the chemical and physical conditions and evolution of molecular cores, disks and the young planets forming within them, also constraining the diversity of their demographical properties.

Outline of the Project: The student will mainly focus on the analysis of VLT/SPHERE, VLT/ERIS, VLT/CRIRES+, and VLT/MUSE data on planet forming disks with the goal of detecting and characterizing the properties of disks and planets embedded within these. Most of the data has been and is being acquired in a series of guaranteed time, large and normal observing programmes as part of an international collaboration. Depending on the outcome of the upcoming observing sessions, the project may include comparison with JWST and ALMA data on free floating planetary mass objects. The student will perform the analysis of imaging and spectroscopic infrared data and will be expected to engage in followup observing programmes as required.

The project comes with funding and resources to execute the research. The student will be expected to actively collaborate within the international ECOGAL team, including exchange visits to and from the partner institutes.

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