Galactic Archeology in the Milky Way and its satellites

PROJECT DESCRIPTION

The Fellow will work within the PRIN 2022 project "LEGO - *Reconstructing the building blocks of the Galaxy by chemical tagging".* This project is aimed at mapping the chemo-dynamical properties of the Milky and its satellites, to reconstruct the chemical enrichment histories of the dissolved satellites that contributed to the formation of these galaxies. The project will exploit the synergy between high-resolution spectroscopy, new chemical diagnostics identified by our team and the kinematic information provided by Gaia. More specifically, three categories/samples of stars will be used to draw a coherent and clear picture of the assembly history of the Galaxy and its satellites: (1) Galactic globular clusters (GCs), as tracers of the accretion events in the entire Galaxy, (2) Galactic field stars, to get a full chemical tagging of the relics of the Milky Way formation in the solar neighborhood, where the kinematic and chemical properties of stars can be obtained with unrivaled precision, (3) field and GC stars in MW satellites that provide a benchmark for the chemical patterns in systems similar to the now-disrupted building blocks of the MW, while also revealing their own history of assembly within the nearly scale-free process of hierarchical merging.

ACTIVITY PLAN

The research project will focus on the analysis of chemical composition and kinematic properties of stars belonging to the Milky Way Halo (especially those with retrograde orbits and candidate accreted stars) and to its satellites, i.e., the Large and Small Magellanic Cloud and the Sagittarius dwarf spheroidal galaxy. High-resolution spectra of stars in these galaxies have been already secured.

This project calls for candidates with expertise/experience in stellar populations, in particular (a) chemical analysis of medium-/high-resolution optical or near-infrared spectra, or (b) kinematic/dynamical properties of stars and stellar populations (i.e., radial velocities, proper motions, integral of motions), or (c) data-handling of large dataset of stellar (chemical and/or kinematic) properties, i.e. clustering algorithms, machine learning.

The appointee will work closely with Alessio Mucciarelli and other researchers involved in the project, i.e. Michele Bellazzini and Davide Massari of the INAF-OAS.