PhD Job Announcements - Milky Way Gaia Doctoral Network

The Department of Physics, Section of Astrophysics, Astronomy and Mechanics of the National and Kapodistrian University of Athens (NKUA) offers one PhD position within the Milky Way Gaia Doctoral Network "Revealing the Milky Way with Gaia" (PI for Greece Despina Hatzidimitriou). The Doctoral Network consists of 10 academic partners across Europe at which 12 PhD students will be researching a range of topics based on Gaia and other data.

PhD description:
Title: Revisiting the asymptotic giant branch phase with Gaia and other data.

The Asymptotic Giant Branch (AGB) is an important phase in the evolution of low and intermediate mass stars. AGB stars are considered to be sites of s-process element production. They are also important dust producers. The structure and evolution of a star in this phase is complex and despite continuing efforts there are still open questions that need to be addressed in a systematic manner by placing improved observational constraints to theoretical models.

In the proposed PhD project, the PhD candidate will construct a machine learning (ML) tool to detect and classify AGB stars and their subclasses (including carbon stars, and luminous super-AGB stars), using multiwavelength photometry (Gaia, 2MASS, Spitzer and WISE), spectroscopy (Gaia, LAMOST, SDSS), and variability information (Gaia, Catalina , OGLE, etc), the latter two to confirm the classification of the objects used for training.

Spectral Energy Distributions (SEDs) will be constructed for the detected AGB stars. These will be compared with synthetic SEDs constructed with DUSTY and information on dust properties will be extracted.

AGB stars (including carbon stars) belonging to star clusters in our Galaxy will be identified using proper motion and parallax information from Gaia. For these stars, additional information on age and metal abundance will be available from the parent cluster. Comparisons of observables (positions in the HRDs, Luminosity functions, T_{eff} and $\dot{M}$ distributions, etc) with predictions of stellar evolutionary models (e.g. Padova evolutionary tracks, MESA models) can provide insights into this complex phase of stellar evolution. A secondary outcome of the project will be a better understanding of luminous super-AGB stars. These stars are probing the minimum mass threshold of the supernova regime from electron capture SNe of ONeMg degenerate cores, from super-AGB progenitors in the uncertain (initial) mass range around 8-9 $M_{\odot}$.

Methods and results will be disseminated through peer reviewed papers.

The PhD candidate will be supported in their endeavor by specialists in machine learning, and the use of the DUSTY and MESA codes.

The candidate is expected to spend at least 2 secondment stays in other Universities in the Doctoral Network.

Contact: Prof. Despina Hatzidimitriou, deshatzi@phys.uoa.gr

Gross salary per year: 33,000€ (or 39,000€ including family allowance, if applicable)

Mobility allowance: A total of ~21,600€ can be used by the PhD candidate private mobility-related costs (e.g. travel and accommodation costs).

Duration: 3 years

Starting Date: September 1st, 2023

Funding: H2020 / Marie Sklodowska-Curie Actions

Work location: Department of Physics, University Campus Panepistimiopolis, Zografos, Athens, Greece

Requirements: Master Degree (preferably in Astrophysics). Very good knowledge of English.

Eligibility criteria: The applicant should not have resided or carried out their main activity (work, studies, etc.) in Greece for more than 12 months in the 36 months immediately before the recruitment date — unless as part of a compulsory national service or a procedure for obtaining refugee status under the Geneva Convention.

Skills: Degree in Physics, Mathematics or equivalent, experience in programming, high academic grades, good communication skills, proactive attitude, good team skills.

How to apply: Send application letter, CV, list of university courses taken and transcripts of grades obtained (i.e., original transcript and also a translated version in English - no need to have it notarized) to Prof. Despina Hatzidimitriou (deshatzi@phys.uoa.gr). Please arrange for two reference letters to be sent to deshatzi@phys.uoa.gr by the application deadline.

Application deadline: April 28th, 2023.

EUROACCESS LINK: https://euraxess.ec.europa.eu/jobs/81147