

JOB DESCRIPTION

Job Title: *Characterizing the first stars with high-resolution spectroscopy of the Pristine survey*

Job Summary:

The oldest and lowest metallicity stars that exist today likely carry the imprint of the first supernovae. This subject of research into metal-poor stars is truly unique to our Local Group, only here can we resolve individual stars and study them in detail. At the same time it is instructive for so many disciplines in astronomy: it guides our understanding of the physics behind star formation, supernovae, the early build-up of galaxies, and the epoch of reionization.

The student shall perform a detailed spectroscopic study of the most metal-poor and oldest stars of the Milky Way found from the unique Pristine photometric survey. They will investigate these outstanding questions of Galactic archaeology and near-field cosmology: What imprint of the very first stars do the most metal-poor stars hold? What were the properties of the first stars? What is there a metallicity floor? What are the chemical properties of the faintest/first galaxies?

Job Description:

To very efficiently increase the number of (very) metal-poor stars, investigate their distribution in the halo, and hunt for the oldest stars, our collaboration has started the *Pristine* collaboration. Co-led by N. Martin at the Strasbourg astronomical Observatory and E. Starkenburg at the Leibniz Institute for Astronomy in Potsdam, *Pristine* builds on a large, dedicated photometric survey of the northern sky conducted with the wide-field imager MegaCam on the Canada-France-Hawaii Telescope (CFHT). Any very metal-poor star shows weak Ca H&K features setting them apart from more metal-rich stars of the same color. The *Pristine* photometric survey builds on this feature to isolate very metal-poor stars much more efficiently than any previous or ongoing metal-poor stars survey. The survey area covers more than a thousand square degrees in the Galactic halo as well as specifically targeted substructures such as satellite dwarf galaxies, globular clusters, and stellar streams

To reach our full scientific potential we have put in place a major spectroscopic follow-up campaign. It culminates with the gathering of high-resolution spectra of the most promising very metal-poor stars in order to derive their detailed chemical abundances and investigate the questions listed above that relate to Galactic archaeology and near-field cosmology. It is expected that the student will take over this axis of research within the *Pristine* collaboration, lead the study of stars already observed and take the leadership of this follow-up program. The analysis of the many different elemental abundances derived through the spectroscopic analysis will facilitate a comparison of the early stages of the chemical evolution of different environments of the Milky Way.

The *Pristine* collaboration is built around the usage of the Canada-France-Hawaii Telescope and is therefore a mainly French-Canadian international collaboration. The recent move of co-PI Starkenburg to Potsdam, in Germany, however means that it also has a strong French-German collaboration, with regular and strong interactions between the two PIs and their teams (N. Martin in Strasbourg and E. Starkenburg in Potsdam). The proposed student would fit naturally in this environment and be co-supervised by Martin and Starkenburg.

Skills relating to high-resolution stellar spectroscopy are a plus but are absolutely not mandatory.

Eligibility criteria :

Candidates will hold a masters degree or equivalent in astronomy or physics from a non-French university or will hold a masters degree from the University of Strasbourg after having conducted their Bachelor's degrees in a non-French university.

Main research field : Astronomy

JOB DETAIL

Type of contract : Temporary

Status : Full-time

Company / Institute : Université de Strasbourg

Country : France

City : Strasbourg

Postal Code : 67000

Street : 4 rue Blaise Pascal

APPLICATION DETAILS (mandatory)

Provisional start date : 01/10/2017

Application deadline : 21/05/2017

Application e-mail : nicolas.martin@astro.unistra.fr