

## **A follow-up observation strategy for peculiar stars from spectroscopic surveys**

**Paula Jofré (PI) & Haining Li (Co-I)**

Núcleo de Astronomía, UDP, Santiago de Chile & NAOC, Beijing, China

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### **Abstract**

We are in the middle of a golden era in Galactic astronomy thanks to the recent launch of the Gaia space mission, which started to deliver the largest three-dimensional map of the Milky Way with unprecedented accuracy of the history of mankind. The billion of stars observed by Gaia will eventually be observed with the largest telescopes on the ground, notably by the on-going and future spectroscopic surveys. Among them, those of particular interest in this proposal are the on-going LAMOST, in China, consisting of 6 million spectra by the end of survey in 2017 at low resolution and the European Gaia-ESO, in Chile, consisting of hundred thousands of stars by the end of survey in 2017 of high resolution as well as future surveys such as APOGEE-2 and 4MOST, aiming at collecting millions of spectra at high resolution from Chilean skies.

Automatic pipelines able to analyse the data are constantly under development and tested against set of well-understood, well-behaved stars that are chosen to be typical Milky Way stars. In these large datasets, however, there is a large number of stars whose parameters will not be accurately derived because these stars are simply not well-behaved nor typical. These stars are usually flagged out from the pipeline deliveries as they do not serve as standard tracers to map the Milky Way. These peculiar stars however contain much information which is crucial to achieve a better understanding of stellar structure and evolution. Throwing these stars away, forgetting them, is a shame.

We propose to develop a strategy to detect such oddities in the LAMOST and Gaia-ESO surveys and perform follow-up spectral observations in high-resolution and high signal-to-noise ratio to study them in depth. This strategy will be based on already developed methods in NAOC but improving using Gaia parallaxes to test the expected parameters with the derived ones. Observing time of detected objects will be requested using the facilities in Chile. The post-doc will work primarily with P Jofré in UDP, and H. Li in NAOC but is encouraged to pursue own independent research in parallel to this project.