



## Research Networking Programmes

Short Visit Grant  or Exchange Visit Grant

(please tick the relevant box)

### Scientific Report

The scientific report (WORD or PDF file – maximum of eight A4 pages) should be submitted online within one month of the event. It will be published on the ESF website.

**Proposal Title:** OCCASO: Detailed chemical abundances of intermediate and old open clusters in the Northern Hemisphere

**Application Reference N°:** 4965

1) **Purpose of the visit**

The purpose of the first part of the visit to the Instituto de Astrofísica de Canarias (IAC) was to advance in writing the first paper of the OCCASO survey that includes the survey description and the first data release of the radial velocities obtained for the 12 clusters, about 50% of the total survey. After this stay, the paper is almost ready to be submitted to MNRAS with Laia Casamiquela as first author.

The purpose of the second part of the visit was to carry out a 5-nights observing run (28th August – 2nd September) with FIES at the Nordic Optical Telescope (NOT) in the Roque de los Muchachos Observatory in La Palma (Spain). This run is part of the OCCASO observational program.

2) **Description of the work carried out during the visit**

With the observational data that we have until now, we have obtained radial velocities for 79 stars in 12 clusters. We have performed several internal consistency checks, as well as comparisons with literature. This has been structured and written as a paper to be imminently published. Discussions with R. Carrera have been essential to complete this.

We have also performed different checks regarding the abundance analysis methods in OCCASO. FERRE is an algorithm that uses a synthetic spectral fitting technique to obtain physical parameters and abundances from an observed spectrum. This method turns out to be very sensitive to small defects in the spectrum (noise, cosmic rays, telluric features, sky lines). We have tried to improve the performance of the algorithm with our spectra by patching conflictive regions of the spectrum.

Regarding the observing run, we have completed five successful observing nights without losses due to bad wather or technical problems. We have obtained a total of xx spectra.

**3) Description of the main results obtained**

We have finished the writing of the first paper of OCCASO. It contains the design and motivation of the survey, as well as the first data release of radial velocities, together with several internal and external comparisons.

We have find a way to improve the performance of FERRE on our spectra. This is the starting point to obtain the abundance analysis with this code, and compare it with the results already obtained with two other methods (GALA and iSpec).

After this observing run we have been able to finish observations for two clusters (NGC6791 and NGC1817) and start observations for three new clusters (Berkeley17, NGC6603 and NGC7245).

**4) Future collaboration with host institution (if applicable)**

The Instituto de Astrofísica de Canarias is part of the OCCASO project and so, the future collaboration is guaranteed, in terms of publication of the results obtained until now, and in terms of the analysis and publication of the observations in the future (we still have 18 nights of observations in the NOT telescope during the next two semesters). Moreover, R. Carrera is the co-director of the PhD thesis of L. Casamiquela.

**5) Projected publications / articles resulting or to result from the grant (*ESF must be acknowledged in publications resulting from the grantee's work in relation with the grant*)**

The visit has been used to finish the writing of the first paper from OCCASO.

The second paper has been started and will be devoted to the physical parameters and Fe abundances for the clusters which we have finished observations.

Future papers will include Fe-peak and alpha elements, as well as special elements which require spectral synthesis (O, Ba,..), r- and s- process elements, for each cluster.

**6) Other comments (if any)**