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## FIES and the Gaia Benchmark stars

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In the panorama of Galactic astronomy, the characterization of Milky Way stellar populations and chemical abundances is of crucial importance for revealing the structure and evolution of the Galaxy. For this reason, hundreds of thousands of spectra have already been obtained by high resolution spectroscopic surveys, and the main challenge for building an accurate picture is the homogenization of these samples from different surveys (Gaia-ESO, RAVE, LAMOST, GALAH and APOGEE) and instruments ( MIKE, FEROS, ESPADONS, HARPS, UVES, NARVAL, ELODIE and CAFE). Especially important is to understand the systematic uncertainties from the different surveys and to have comprehensive and consistent validation samples. In 2014 and 2015 the first attempt at a set of reference FGK-type stars called the Gaia FGK benchmark stars (GBS) was published (Heiter+2015, Jofre+2014). In the past 7 years much progress has been made regarding the performance of parallaxes and angular diameter measurements of stars in general and the sample has been noticeably enlarged.

Currently, it comprises around 200 stars observed in both hemispheres with a magnitude range of  $0 < V < 10$  covering most of the parameter spaces. Among these stars 48 were observed with FIES. I conducted the observations for 15 of these stars during the NOT internship period. Their spectra have been recently analyzed using a pipeline developed in Casamiquela+2020 together with other observations of the same stars with different instruments. I will present the preliminary results of the analysis of the FIES observations, and the comparison between different instruments. The full sample of the GBS will be used as a future reference sample for stellar galactic surveys, in particular the ASTRA pipeline of SDSS-V, the upcoming ESA PLATO mission, WEAVE and 4MOST.

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