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THE GAIA-ESO SURVEY: DETAILED ABUNDANCES FOR THOUSANDS OF FGK-TYPE STARS

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The Gaia-ESO Survey is using FLAMES at the VLT to observe more than 10^5 stars. Giraffe medium-resolution spectra is being obtained for $\sim 10^5$ stars and high-resolution UVES spectra is being obtained for ~ 5000 stars. Here I present a short summary of the Survey with emphasis on the sample of FGK-type stars being observed with UVES.

Gaia-ESO is observing targets in all major Galactic components (halo, bulge, thin and thick disks) and in a sample of ~ 100 open clusters with different ages and metallicities (Gilmore et al. 2012, Randich & Gilmore 2013). Data analysis is divided among five working groups, according to the type of targets and the spectrograph used for the observations (Giraffe or UVES).

The FGK-type stars observed with UVES[2] consist of solar-neighborhood FG-type dwarfs (within $\sim$ 2 kpc of the Sun), clump giants in old and intermediate-age open clusters (age $\gtrsim$ 100 Myr), selected main-sequence and pre-main-sequence stars in young clusters (age $\lesssim$ 100 Myr), and selected giants in the outer/inner Galactic disk and the bulge.

Science verification analysis of the spectra observed up to the end of June 2012 has been completed. The results include atmospheric parameters and abundances of 421 FGK-type stars observed with UVES (Smiljanic et al. 2014). For the moment, these results are available only internally to the Gaia-ESO collaboration. The number of FGK-type stars observed with UVES will increase to ~ 1500 for the first public release of advanced data products, expected for mid 2014, and will be of ~ 5000 stars in the end of the Survey.

The science verification results include atmospheric parameters and abundances for 18 elements determined for at least a handful of stars: Li, C, O, Na, Mg, Al, Si, S, Ca, Ti, Cr, Ni, Zn, Y, Zr, Mo, Ce, and Dy (Smiljanic et al. 2014). Elements that have important hyperfine structure were not analyzed for now, but will be included for the first public release.

As an example, abundances of Na (not corrected for NLTE effects) for solar-neighborhood dwarfs are shown in Fig. 1. This kind of result is important, for example, for studies of the chemical evolution of the solar neighborhood. The detailed chemical information coming from the Gaia-ESO results will enable a variety of studies in areas like stellar evolution, formation and disruption of open clusters, and Milky-Way formation and evolution.

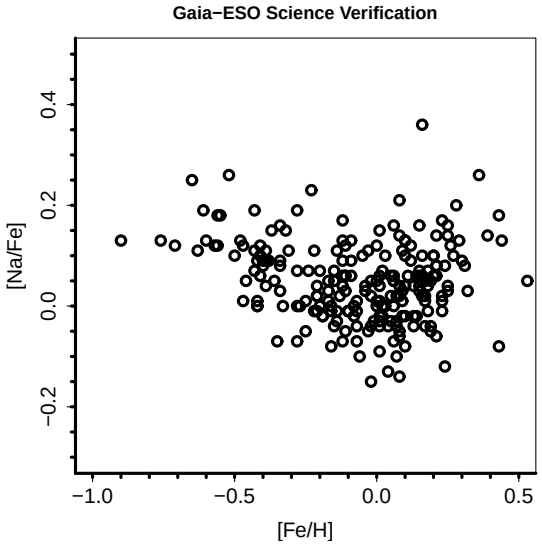

Fig. 1. Sodium abundance as a function of metallicity for 218 FG-type dwarfs from the Gaia-ESO Survey science verification results.

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[2]With the #580 set up, R = 47000 and $\lambda\lambda$ 476-684 nm.